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Future of Welding

Extended Application and New Problems

QUITE apart from the repair work and reconditioning or strengthening by building-up with the aid of electric welding, which for years has been common practice, we believe it would be quite exceptional nowadays not to find methods of fabrication by welding employed in most of the larger general engineering, railway and shipbuilding establishments. Certainly many of the electrical and allied manufacturers are using welding on a fair scale.

Some of them go so far as both to design and make their own equipment, and it can be conservatively estimated that the number of manufacturers of electric welding machines in this country is approximately forty-two. There are twenty-three makers of resistance welding machines and twenty-nine manufacturers of electrodes, apart from suppliers of rectifiers for welding and thermionic valve control devices. In addition, one or two concerns produce holding frames for rotating or otherwise manipulating the " work " while it is being welded.

These figures are based upon the collective records of the Institute of Welding. They are not necessarily complete, since there is no welding appliance manufacturers' association from which to seek statistical information of this kind. This is a want which is beginning to be felt. Indeed, the compilation of data and records by an independent body has almost become a necessity.

Extensive Research

It has been asserted that probably not more than a quarter of the known applications of welding are commonly utilised. This contention is supported by the large amount of research at present being conducted, as revealed by the second progress report of the Research Committee of the Institute of Welding, which has twenty-eight Sub-committees and Panels. Its activities are supported by the Department of Scientific and Industrial Research, six other Institutions and Societies and forty engineering firms, including fourteen electrical manufacturers. Investigational work is also proceeding at the Universities of Birmingham, Bristol, Cambridge, Durham and Glasgow.

Further evidence, if needed, of increasing applications is the issue officially of regulations and specifications for welded steelwork by national bodies in Great Britain, Australia, India, the U.S.A., Switzerland, Poland, Italy and Germany. In addition, rules have been made by such representative bodies as the London County Council in respect of structural steelwork, Lloyd's Register of Shipping, the British Engine, Boiler and Electrical Insurance Co., and the Factory Department of the Home Office for the protection of operatives, while several relevant specifications have been issued by the British Standards Institution.

There is thus no difficulty in imagining the role which welding will eventually assume in manufacturing processes. Indeed, by some it is considered likely to become so extensive as ultimately to employ practically as much capital and labour as the steel industry now does.

Reducing Time and Weight

The substitution of fabrication for casting is advantageous to heavy machine makers in a number of ways, but principally because it obviates the necessity for pattern making. Thus is eliminated the time lost in the foundry, which may be considerable when fresh designs are being evolved. A lighter article is produced, as much as 25 per cent. in weight being saved in large components, since rigidity is achievable without recourse to heavy masses of metal. Welded steel is, of course, less liable to fracture than relatively more brittle castings.

Such considerations as these weigh equally, if not more, in shipyards, but remembering the inherent water, oil and gas tightness of welded vessels, the rate of advance in this country might seem slower than is warranted by experience already gained elsewhere.

Ultimately, the criteria are financial economy and structural betterment. Individual ideas still differ about what are reasonable limits to ship welding and the progressive widening of applications is revealing fresh problems. These are not solely metallurgical or mechanical, but also involve preplanning with care, for large-scale operations indicate the desirability of carrying out as much as possible of the actual welding in specially devised workshops rather than at the shipbuilding berth.

This requirement will in many cases entail the redesign of component sections to render them more

transportable, which in turn will call for the provision of suitably adequate manipulative and lifting equipment. These added economic factors are to some extent compensated for by the likelihood that welding in the open air in any sort of weather will more often lead to defects than when the same work is done in covered shops so laid out as reasonably to control temperature, humidity and draughts. Moreover, the hull, which must be built up on the slip, cannot be annealed as a whole to relieve welding stresses.

Thus the increased difficulties of large-piece welding will not permit of any material saving in wages, excepting cases of simple connections. But it cannot be denied that any form of construction which is properly developed for welding, not merely serving as a substitute for riveting, can be effected with less material and with at least the same, if not greater, strength. Therefrom will result a natural saving in material costs rather than a diminution of wages paid.

Local or National?

AN interesting point of law is raised by the refusal of the Electricity Commissioners to sanction the extension of the Queensferry generating station of Chester Corporation. The Commissioners admit that the Corporation could meet the demands of its consumers at a lower cost by installing new plant than by taking a bulk supply from the grid. This would in itself have been enough under the Act of 1919 to make official consent a mere matter of form. In the 1926 Act, however, it is stipulated that the decision to give such consent must have regard to its effect on any schemes under that Act. This raises anew the question (which has been put before in a somewhat different form by the owners of selected stations) as to whether reductions in generating costs should go to the consumers of the undertakings primarily responsible or be passed on to the inhabitants of the country as a whole. As the Corporation is considering taking legal proceedings to test the validity of the Commissioners' ruling, the matter must at present be regarded as *sub judice*, but it is regrettable that it was not possible in this instance to decide the point at issue on a comparative cost basis as in other cases instead of having to rely upon the somewhat indefinite argument of broad national policy.

Rationed Electricity

BY October 5th electricity supply authorities will have issued their notices to consumers acquainting them with the primary or basic quantities upon which their rations of electricity will be calculated. The scheme will involve them in a good deal of extra work which suppliers of raw coal will escape. They will have to keep their eyes upon the consumers' meters and, if necessary, report excess consumption to the local fuel overseers. The latter may then order the supply to be disconnected for a specified period, although we presume that this power will not be exercised too readily when a warning will probably be all that is necessary in most cases. It has been rather hastily assumed by many daily newspapers that all slot-meter consumers are exempt from rationing. This is no doubt due to the involved wording of the relevant paragraph of the Order, a failing which pervades the whole of that remarkable exercise in obscure English. The paragraph in question reads as follows:—

> "This Order shall not apply to the consumption of electricity in premises in which a supply of electricity cannot be obtained except upon prepayment therefor by means of a meter adjusted in relation to the amount of energy obtained by reference to the charge made for purposes of lighting to ordinary consumers who do not also pay a periodical fixed or service charge."

It means that lighting prepayment-meter supplies are "uncontrolled" and this might have been said in much fewer words. We have thought it advisable after hearing and reading so many different interpretations of the Order to set out in this issue its main provisions as clearly as we can after much study of the document.

Our Domestic Issue

WE have already announced our intention of proceeding with our annual Special Domestic Issue. It will appear next week and, as usual, will review recent progress in lighting, heating, water-heating, cooking and other apparatus. The articles will include a forecast of prospects for domestic electrification by Mr. V. W. Dale, an acknowledged authority on these matters; advice on the best use of rationed electricity by Miss Caroline Haslett, director of the Electrical Association for Women, whose admirable memorandum on the subject was reviewed in a recent issue; and views on the planning of domestic installations by Mr. T. C. Gilbert. We hope by the publication of this issue to dispel the fears of some in the industry that domestic electrification will, or should, be held up for the duration of the war. Electricity now plays a vital part in the running of millions of homes and any suggestion that it should go no further for an indefinite period is one which no member of our industry should countenance.

Readers are earnestly requested to instruct their local newsagents to reserve a copy of the ELECTRICAL REVIEW for them regularly in order to facilitate distribution arrangements and avoid the risk of failure to obtain copies.

In the interests of the paper itself in these difficult times it is particularly hoped that regular purchase will be made from the same newsagent or bookstall each week. To assist readers an order form is provided on page 433.

Electric Vehicles

THE Fuel and Lighting Order gives local fuel overseers discretion in the fixing of basic quantities for "controlled" premises. It is to be hoped and expected that this discretion will be exercised in favour of traders who already use electric vehicles in their businesses as well as those who replace petrol vehicles by "electrics" for their delivery work. The Electric Vehicle Association of Great Britain advises vehicle owners to approach local fuel overseers when they receive their basic quantity notices from their supply undertakings. Details should be given of the electric vehicles in use and request made that the full allowance should be made for them, or, where additions are being made or contemplated, that an additional consumption should be permitted. In the event of a refusal on the part of a local fuel overseer to accede to the request an appeal against his decision may be made to the divisional coal officer.

Street Lighting Control

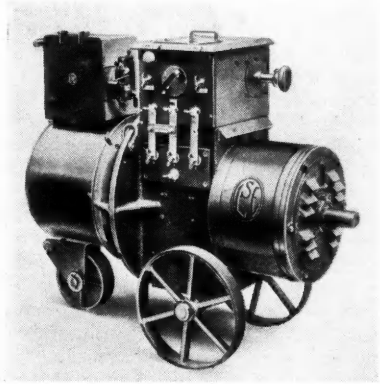
JUDGING by comments in the daily papers, there appears to be a popular impression that the reason for keeping the streets dark at all times after nightfall is that public lighting cannot be cut off at short notice without shutting down general lighting at the same time. This is certainly not true of electric lighting as (apart from separate cables and switch wires for public lamps) there are some eight or nine systems of discriminative control on the market, many of which have been shown in different towns to be reliable and effective. These systems have also a peace-time value, as they can be used for peak control, *e.g.*, switching off and on storage water heaters, but they require special apparatus and could not be installed everywhere immediately. Our advocacy of some relaxation of restrictions on lighting in inland towns are supported by Mr. C. H. Yeaman, of Stoke-on-Trent, in a letter published in this issue and also by the proposal of the Bolton Corporation to utilise 200 local street lamps to indicate the positions of air-raid shelters, etc.

WELDING EQUIPMENT

Recent Developments

IT will be recalled that the biennial Engineering and Marine Exhibition at Olympia in 1937 was probably the first occasion on which a concerted display of welding plant was attempted on a large scale in England. The postponement indefinitely of the Exhibition that was to have been held this month has deprived many people of the opportunity of gauging the progress achieved during the intervening two years. In lieu thereof, reference may not unreasonably be made to some of the equipment that would have been displayed had circumstances permitted.

For example, part of the collective display of the Department of Scientific and Industrial Research was to have dealt with the weldability of high-tensile structural steel and of non-ferrous metals, with the application of welding to ship structures and to frame structures, and with research into repeated stresses applied to welds. A specially interesting item would have been a crack-testing machine that has been designed for comparing electrode deposits by bending during the welding operation, and thus under conditions immeasurably more severe than those likely to be met with in practice. The standard test enables direct comparison to be made between different types of electrodes.



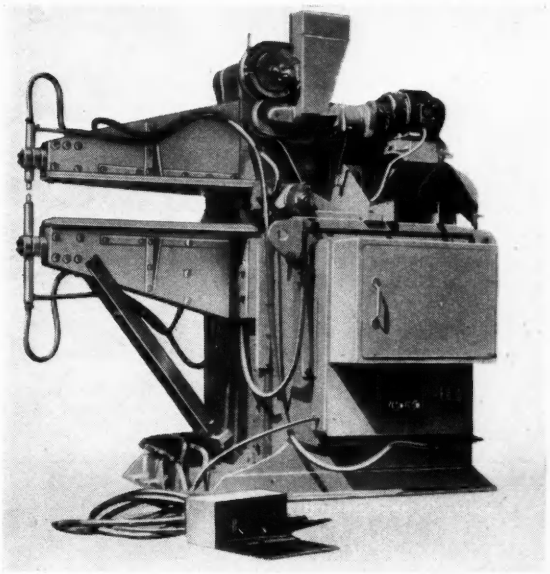
Laurence, Scott AC driven transportable "K-S" welder

The range of portable magnetic detecting machines introduced by New Process Welders, Ltd., includes a DC type indicating failures in welds due either to cracks or to lack of penetration, and an AC machine for testing radial cracks in the rivet holes of boilers and also for cylinder blocks, gudgeon pins, etc.

This company's welders now include suspended types in which the electrode pliers and the transformer are made in one unit. Other "NPC" outfits are a spot welder with a capacity of 75-kVA on steel and 250-kVA on aluminium, equipped with alternative control gears, one being a valve timer capable of a range between five cycles and seven seconds, and the other a synchronous timer capable of a range of half a cycle to ten cycles in half-cycle steps. The machine is air-operated, and all mechanical and electrical settings can be changed and the positions recorded.

There is a 25-kVA machine which can be used either for spot or projection welding, pedal operated 8- and 6-kVA machines, and a small bench model with alternative hand pliers of 2-kVA designed primarily for the internal parts of wireless valves, neon tubes and similar articles.

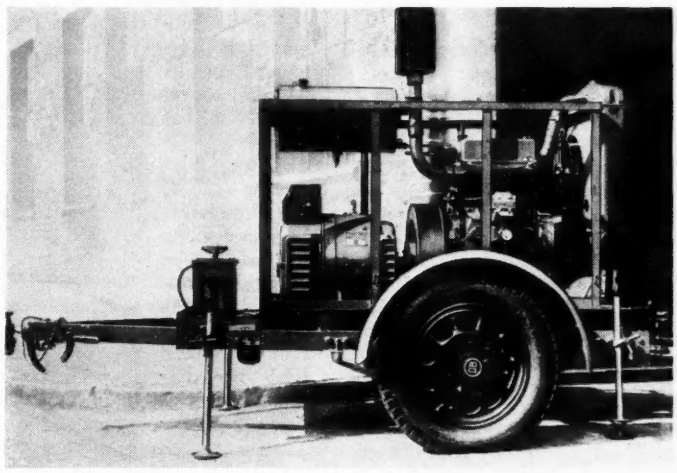
A seam-welding machine of 25-kVA capacity is suitable for either longitudinal or circumferential welding up to a maximum of two 18-gauge sheets. The butt-welding range includes machines of 2-, 12- and 25-kVA capacities.



A-I automatic spot welder for aluminium alloys, showing electrodes in normal working position

A spot light is made by Philips Lamps, Ltd., for assisting in the accurate positioning of welds. Besides welding rods, there is dual plant for delivering both AC and DC, as well as transformers and rectifiers. The last mentioned incorporate oxide cathode valves, and are claimed to have a very rapid "recovery time" of less than 0.002 sec. between short-circuit and full no-load voltage.

Among Philips resistance welders (licensees: Languepin) are heavy duty types, *e.g.*, one of 65-kVA for making up to 5,000 spots per hour; another has an extremely small hydraulic pinch for specialised work, while one of the condenser-operated range has been specially developed for welding aluminium and other light alloys. Machines of this class reduce the load imposed on the supply mains, and regularly average 300 welds before the electrodes need cleaning.

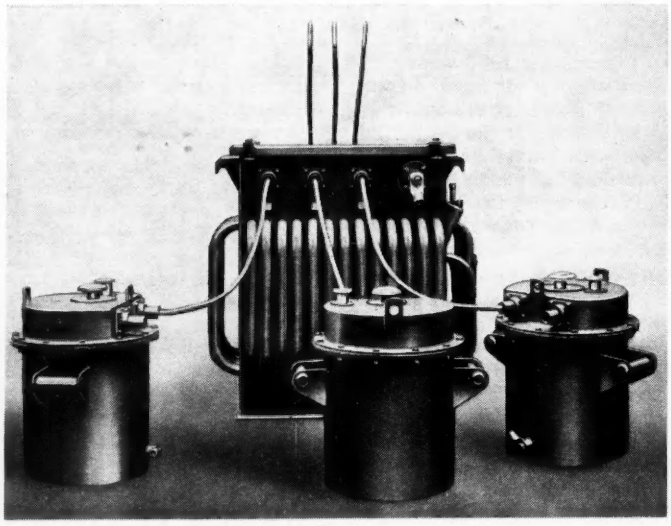


Quasi-arc single-operator Diesel set mounted on trolley

The "K-S" welder introduced about two years ago by Laurence, Scott & Electromotors, Ltd., is a generator of patented design. Regulation is effected by magnetic saturation and leakage, a system

which avoids the necessity for working at certain settings with the magnetic circuit in an unstable condition.

A detachable regulator includes a polarity reversing switch in the case of the larger-sized machine. This feature can be a great convenience when a man is welding in some awkward position and cannot have the set within reach. There is only one regulator handle and the current setting is indicated on a calibrated scale. For large outputs two or more machines can be connected in parallel, and they will share the load without the necessity for exact setting of the two regulators.

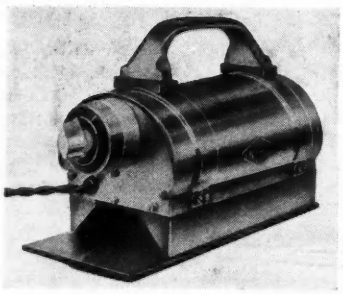


English Electric three-operator AC arc-welding equipment showing transformer and three welding regulators

The standard squirrel-cage motor can be operated in star connection when the generator is on light loads, so that efficiency and power factor are maintained.

The brushgear is fixed, all current adjustment being carried out on the regulator. Sets are made for driving from existing line shaft or engine, stationary or transportable AC or DC motor-driven sets, petrol or Diesel engine sets, trailer sets for towing behind a car or light van, etc.

The multi-operator equipment of the English Electric Co., Ltd., consists of a transformer arranged for supplying three regulators with up to 300A, and connected delta interstar, which gives the maximum equal distribution of current on the primary side under welding conditions.



Hand magnet crack detector (New Process Welders)

Insulated and mechanically interlocked plug and socket connectors are provided for connecting the transformer to the regulators, which are of the oil-immersed self-cooled type.

An externally operated switch fitted in the cover of the regulator is provided for selecting current values to suit the particular electrode being used; either 24 or 36 steps are provided according to the size of the regulator, one of which is of the universal type for taking electrodes from 20 gauge to 4 gauge. The most recently introduced has a range of 15 to 120A in 18 steps for sheet metal workers, garages, &c. Portable equipments are also of the oil-immersed self-cooled type.

Apart from electrodes the Quasi-Arc Co., Ltd., makes oil-immersed transformer sets, both portable and stationary. The triple-frequency set is both a phase and frequency convertor. The windings are so arranged that an accurately balanced load is taken from a three-phase supply. The output is single-phase at a frequency three times that of the supply mains, which is said to be an advantage in respect of arc stability and ease of working.

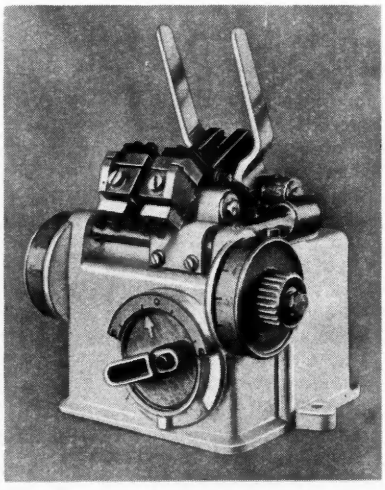
A single-operator Diesel set incorporates a 16-HP twin-cylinder Lister engine coupled to a specially designed DC drooping characteristic generator giving a maximum of 250 A. A less expensive unit incorporating a Ford four-cylinder petrol engine can be mounted on a trailer or in simpler form for carrying in a lorry.

Murex Welding Processes, Ltd., have a wide range of electrodes for ferrous and non-ferrous metals, together with AC and DC welding plant, including transformer and motor-generator sets on pneumatic-tyred wheels, a mobile petrol-engine driven plant (Morris engine) for one operator mounted on a two-wheel pneumatic-tyred trailer for high-speed towing, and a Diesel-engine driven motor-generator set on cast-iron wheels.

Welder's accessories include "Lamurex" protective glasses and "Long Life" cover glasses for welders' screens and masks. The automatic "Gasflux" process of applying flux to brazed or welded seams consists of a device which can be fitted into the existing gas service pipe of the heating torch so as to supply the flux in gaseous form to the flame.

The A.I. Electric Welding Appliances Co., which has manufactured electric welders in this country for the past twenty years, has now become associated with Thomson-Gibb Electric Welding Co., U.S.A., and S.A. Electromécanique, Brussels. Its latest electric rivet upsetting machine is air operated and fully automatic in operation. A 300-kVA spot welder for aluminium alloy is capable of high-speed production work. In portable spot-welding equipment with automatic compensative control the "Hydromatic" pressure available has enabled the dimensions of the welding tool to be reduced, thereby obviating undue physical effort on the part of the operator.

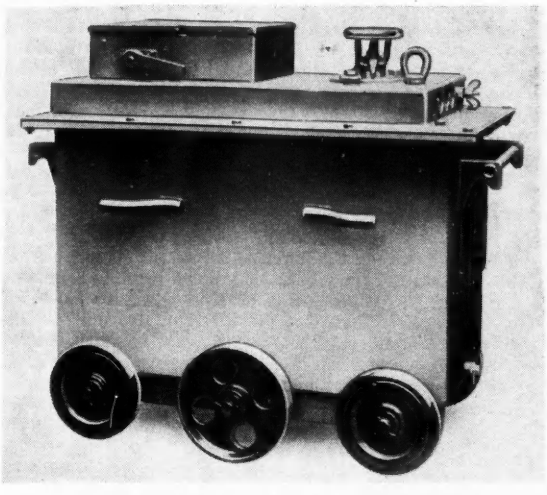
In the seam-welding machine range are large and small types with interchangeable heads for longitudinal and circumferential welding in sheet metal work. A butt wire welder is calibrated in wire gauges on the various movements of the machine, enabling the welder to be immediately set according to the gauge of wire being welded. An 80-kVA combination automatic flash welder for metal window casements is capable of mitre welding and reverse bar welding, producing up to 200 welds per hour. Machines for the electrical heating of rivets are also made.



A-I wire welder

A new type of spot welder (Metropolitan-Vickers Electrical Co., Ltd.), a description of which was pub-

lished in our September 15th issue, is specially designed for spot welding aluminium and its alloys, with particular reference to Duralumin and other heat-treatable alloys. These machines, which are manufactured in two sizes, are of particular interest because of the Ignitron programme control equipment used in con-



Quasi-arc triple-frequency transformer set

junction with them, by means of which a series of operations, accurately timed, is carried out in a predetermined sequence.

Transportable weather-proof sets offered by Siemens-Schuckert (Great Britain), Ltd., driven by three-phase or DC motors, can be removed from their undercarriages for stationary use if desired. A dual-operator outfit has a single driving motor with two generators, each of 20 to 250 A, and provision for automatically increasing the voltage when the two generators are connected in parallel, thus giving a larger welding range than that of each generator individually.

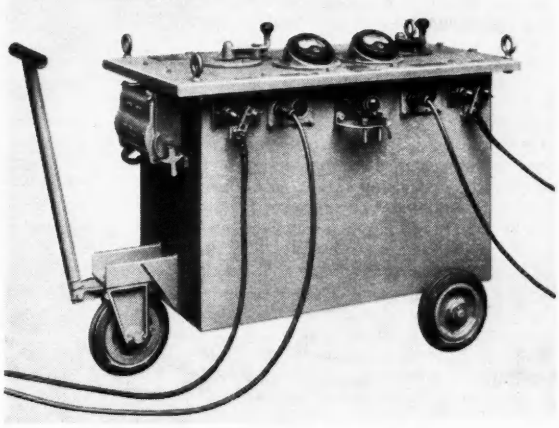
Among resistance machines is a bench spot welder for thin sheets, strips and wires of either steel or non-ferrous metals, having a rating of 3 kVA, complete with automatic valve-timer, with a range from 4 cycles to 3 seconds. This machine has a reach of arms of 4 to 6 in. and a vertical movement of $\frac{1}{4}$ to $\frac{1}{2}$ in.

Valve control equipment is offered for spot welding machines up to 200 kVA at 500 V, 50 cycles. The time range can be varied from 1 to 25 cycles, permitting the welding of upwards of 400 spots per minute. Special machines for spot welding non-ferrous metals, such as aluminium, alloys, brass, &c., differ merely in the length of reach, which governs the output of the transformer, 100/300 kVA, regulated by three drum controllers in 64 steps. The drive for the compressed air programme control is incorporated in the upper arm, the lower arm swivelling, while the programme control for the current and the welding time is contained in three steel cubicles, placed near the machine.

Among accessories is a selection of hand magnets for crack-detection in seams of varying current ratings.

In co-operation with the Institution of Naval Architects, the Shipbuilders' Conference and the Institution of Engineers and Shipbuilders of Scotland, the Institute of Welding has built a special testing machine with which to ascertain the "soundest, lightest and most economical" methods of welded construction, based on equivalent efficiency and strength of riveted sections as laid down in existing rules and regulations.

These investigations are being conducted under a



Murex two-operator transformer

committee representing all interests concerned, including the Admiralty, the classification societies and steelmakers; their results should enable new tables for the instructional guidance of ships' welders to be drawn up by the Board of Trade and classification societies similar to those now in use for riveted construction.

Electricity Rationing

Explanation of Order

AS there is still some doubt about the operation and effects of the scheme for rationing electricity, mainly on account of the rather involved wording of the Fuel and Lighting Order, we think that it may be useful to give readers some rather fuller particulars than were published in our issue of September 8th.

In the first place it should be stated that the Order applies to "controlled" premises which are defined as (*a*) any premises not used or appropriated wholly or mainly for industrial purposes, and (*b*) any premises used or appropriated for industrial purposes, other than premises in which the consumption of coal (including the equivalent of coal in respect of gas and electricity consumed) during the standard year was more than 100 tons. For the purpose of calculating equivalents one ton of coal is taken to be 100 therms of gas or 1,400 kWh. The standard year means, as regards coal, the year ended June 30th, 1939, and as regards gas and electricity a period of twelve months ending on the undertaking's quarter date (*i.e.*, meter reading) next before June 30th, 1939. Rationing is to be controlled by local fuel overseers to whom supply undertakings will be responsible.

The Order does not apply to consumers obtaining electricity through a lighting prepayment meter; nor to those whose consumption does not exceed what is termed the "primary quantity," *i.e.*, 34 kWh in each of the summer quarters and 66 kWh in each of the winter quarters—a total of 200 kWh a year; where cooking is done exclusively by electricity the figures are 200 kWh for the winter quarters and 300 kWh for the summer quarters—a total of 1,000 kWh a year. Where the consumption during the standard year has exceeded the primary quantity, that consumption will be considered a "basic quantity" and the quarterly "ration" will be 75 per cent. of the consumption during the corresponding quarter of the standard year.

It is provided that within 28 days of the coming into force of the Order (Sept. 7th) all undertakers shall notify in writing the occupier of each premises supplied by them the periods in each year which shall be quarters for the purposes of the Order and the basic or primary quantities fixed for the premises. An appeal can be made by the occupier to the local fuel overseer or other person appointed by the divisional coal officer if he considers that the notice is incorrect.

If another form of cooking is introduced into premises formerly employing electric cooking only, or if electric cooking is introduced in the place of coal or gas the primary quantities can be amended accordingly. In the case of new consumers the local fuel overseer can direct the undertaking to notify the consumer of an appropriate basic quantity.

Where the consumption in any quarter exceeds the permitted quantity the undertakers must notify the local fuel overseer who may direct the undertakers to disconnect the supply for a specified period. Costs incurred by the undertakers in the disconnection or reconnection of the supply will be borne by the consumer.

REGISTRATION OF ENGINEERS

American I.E.E. Drafts New Law

A DRAFT model Law for the Registration of Engineers in the United States, which was drawn up by a committee appointed by the American Institute of Electrical Engineers in 1937, has now been approved by that body after considering comments offered by the local sections. The scope of the proposals is indicated in the full title, which is "An Act to regulate the practices of professional engineering and land surveying; creating a State Board of Registration for professional engineers and land surveyors; defining its powers and duties; imposing certain duties upon the State and political sub-divisions thereof in connection with public work; providing penalties."

Under the heading of "General Provisions" in the opening section the purpose of the Act is stated to be the safeguarding of life, health and property. To that end any person practising professional engineering or land surveying (the latter as affecting property rights) shall be required to submit evidence that he is qualified to do so. No person not registered in the manner prescribed may in any way imply that he is a professional engineer or land surveyor.

Definition of "Professional Engineer"

A "professional engineer" is defined as one who is qualified and registered to engage in professional engineering. "Professional engineering" includes any professional service for hire to the public or in public employment, such as consultation, investigation, planning, design or responsible supervision of construction or operation in connection with structures, machines, equipment or processes wherein the safeguarding of life, health or property is involved and requiring the application of engineering principles and data.

The provisions of the Act would be administered by a State Board of five professional engineers appointed (ultimately) for five years by the Governor of the State from the nominees of engineering societies selected by him. Each member of the Board is required to be a citizen of the United States and resident in the State in question. He shall have been engaged in professional engineering for at least twelve years and in responsible charge of important engineering work for at least five years. He would receive a daily allowance for attending to the work of the Board in addition to expenses. The Board may subpœna witnesses and require the production of documents in a case involving the revocation of registration. In the event of refusal the Board may appeal to the Courts.

A roster showing the names and places of business of all professional engineers would be sent yearly to each registered person, to the public on request, to principal local authorities and to the Secretary of State.

Qualifications

Three kinds of qualifications are set out as providing the minimum for registration:—(*a*) Graduation after a four-year engineering curriculum at an approved school or college and four years' experience in approved engineering work; the Board may, in counting years of experience, give credit not in excess of one year for satisfactory graduate study. (*b*) Passing the written or written and oral examination designed to show knowledge and skill approximating to that attained through a four-year curriculum and eight years of experience. The satisfactory completion of each year of an approved curriculum without graduation would be considered as equivalent to a year of experience. Graduation in a curriculum other than engineering may be regarded as equivalent to two years of experience, but no credit for more than four years of experience will be allowed. (*c*) Twelve years of practice in professional engineering of a kind to indicate that the applicant is qualified to design or supervise engineering construction, providing he is not less than twenty-five years of age. Engineering teaching may be construed as engineering experience. Persons having the requisite qualifications but not in practice are not debarred from registering.

Applications for registration are to contain statements made under oath of details of education and technical work, supported by five references of which three must be given by professional engineers with personal knowledge of the candidate's engineering experience.

Provision is made for registration fees. At the discretion of the Board examinees may be permitted to select questions pertinent to their speciality. A candidate failing on examination may apply for re-examination without fee after six months. Subsequent examinations may be granted on payment of a fee.

At any time within one year after the Act becomes effective, any professional engineer who submits evidence under oath that he has been practising professional engineering of a kind approved by the Board may apply for registration without the need to undergo an examination. After a given date, it will become unlawful for any State or local authority to engage in the construction of any public work of a value exceeding a certain amount which involves professional engineering, unless the plans, specifications and estimates have been prepared by, and the construction executed under, the direct supervision of a registered professional engineer.

Registration Certificates

A certificate of registration may be issued to any person holding a certificate of qualification granted by certain authorities provided the requirements of such certificate are of a standard not lower than that prescribed in the Act. Certificates under the Act may be revoked by a majority vote of the Board in cases of deceit in obtaining registration or of gross negligence, incompetency and misconduct in the practice of engineering. The Board may reissue certificates by a majority vote. Right of appeal to the Courts is permitted.

Any person who offers to practice professional engineering without being registered or otherwise represents himself to be qualified or violates any of the provisions of the Act shall be guilty of a misdemeanour and liable to penalties.

The draft concludes with a saving clause to cover exceptional cases and to exclude from its provisions officers of the Government, the work of contracting (as distinguished from design) or its supervision by foremen as well as technical engineering when not for hire to the public or in public employment.

Queensferry Station

Refusal to Extension

THE result of the official inquiry, which was held at Chester from March 7th to 10th and in London from May 24th to 26th, into the application of Chester Corporation for consent to extend its Queensferry generating station and to borrow £397,280 for the purpose was discussed at a meeting of the Electricity Committee on September 12th.

A letter from the Electricity Commission was submitted in which it was stated that the Commissioners had been advised that they would be entitled to refuse their consent in a case where the cost of local generation had been shown to be no greater than that of taking a supply of electricity from an alternative source, if they came to the conclusion that, having regard to the Act of 1926 and the effect of any scheme or proposed scheme thereunder, they ought to do so. The Commissioners said that while they found themselves unable to accept in their entirety the estimates submitted on behalf of the Corporation or of the Central Electricity Board, they were satisfied that the Corporation would, if consent were given, be able to meet the present and prospective demands of its consumers adequately at a cost less than that at which it could do so if it obtained a supply from the Central Board.

There was no reason, the Commissioners considered, for refusing consent under Section 13 of the Act of 1922 in the interests of general supply in the North Wales and South Cheshire Electricity Districts, within which a small part of the Corporation's area of supply fell. They had, however, to take into account Section 18 (2) of the Act of 1926, and accordingly decided to refuse their consent.

Mr. S. E. Britton, engineer and manager of the Chester undertaking, estimated that independent operation would have saved the Corporation upwards of £100,000 for the years 1942 to 1945, inclusive. The Town Clerk was authorised to take further advice of leading counsel upon the question of testing the decision of the Commissioners and to institute such legal proceedings as counsel might advise.

Section 13 of the Electricity (Supply) Act, 1922, provides that the Electricity Commissioners shall not refuse their consent to the extension of a station if it be proved to their satisfaction that the undertaking would, if the consent were given, be in a position to give an adequate supply of electricity at a cost not greater than that possible if they obtained a bulk supply. Section 18 (2) of the Electricity (Supply) Act, 1926, states that the Commissioners "in determining whether to give or withhold consent or approval" required under the Acts from 1882 to 1922, "shall have regard to the provisions of this Act and the effect of any scheme or proposed scheme thereunder."

COIL WINDING

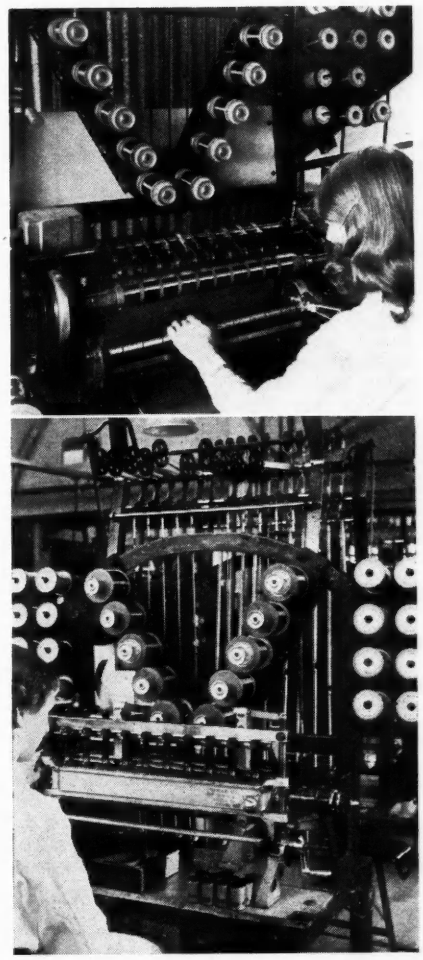
Modern Methods at the Westool Factory

ALTHOUGH best known as electric tool and motor manufacturers of over twenty years' standing, Westool, Ltd. (formerly the Westminster Tool & Electric Co., Ltd.), has for several years past steadily developed a less advertised section of its activities, *viz.*, coil winding. Originally this was a side line arising from the work of the motor winding department, but such rapid progress was made that eventually a new factory specially laid out for this work was erected adjoining the company's existing premises.

Recently, Mr. G. R. Hook, the managing director, invited us there to see the methods adopted, and he showed us coils being produced in all sizes from 1 oz. to 2 cwt. in weight, the gauges of wire used ranging from 47 to 10 s.w.g. The whole system is based on the scientific application of correct tension, even layering of the wires, absorption of surge and avoidance of straining of the wires while winding, and all the machines employed have been specially designed and developed by the company with this end in view.

In the construction of these machines, full advantage has been taken of the newer light alloys now available so as to reduce inertia of the moving parts to a minimum, and vibration has been eliminated by careful balancing of all rotating units. The majority of the coil-winding machines are capable of handling ten coils at a time. This, Mr. Hook told us, is about the maximum an operator can reasonably be expected to cope with.

Schedules of the various components required for each particular order are issued to the preparation stores, where the insulating materials, leads, &c., are all cut to the desired size and the whole collection of prepared articles needed for the order is placed in trays ready for the operators to use. A remarkable economy and cleanliness of handling thereby results, and the use of the correct grade and quantity of insulation is ensured.



Winding iron-cored relay coils and (above) h.v. coils with automatic paper insertion

Indeed, cleanliness is the keynote of this factory, and as a further example of the company's precautions to ensure this in production it may be mentioned that the reserve bobbins of wire are hung on pegs at the side of the machines, thereby minimising the collection of dust and also damage by knocking together, which is so difficult to avoid when the reels are stored in boxes.

During winding the tension is applied through very delicate cams operating through a series of reducing levers, the use of very long springs (2 ft. or so) ensuring that the tension remains practically constant. Charts are kept for every half-gauge of wire giving the permissible tension that may be applied. These are kept by the charge hands, the operators themselves having nothing to do with the setting up of the machines. With the exception of the tension, which the operator cannot alter, every automatic process on the machine has hand control as well, so that the operator can use discretion regarding necessary slight adjustments.

To drive the machines variable-speed single-phase commutator-type motors of the company's own make are used. We were particularly impressed by the remarkable sensitivity of the Westool system of speed control. There are no clutches and any desired speed of running is readily obtained by foot-control-operated induction regulators. Automatic layering is obtained by devices incorporating worm shafts and worm wheels coupled with a unique form of reversing device, and on many of the machines automatic interleaving of paper insulation is provided—two sheets in some cases.

Whenever possible, coils are wound horizontally, ten at a time, on long formers and afterwards cut by means of a circular blade mounted on a spindle below the formers. The spindle is slotted to keep the blades in the correct position and an adjusable stop makes sure that the cut is

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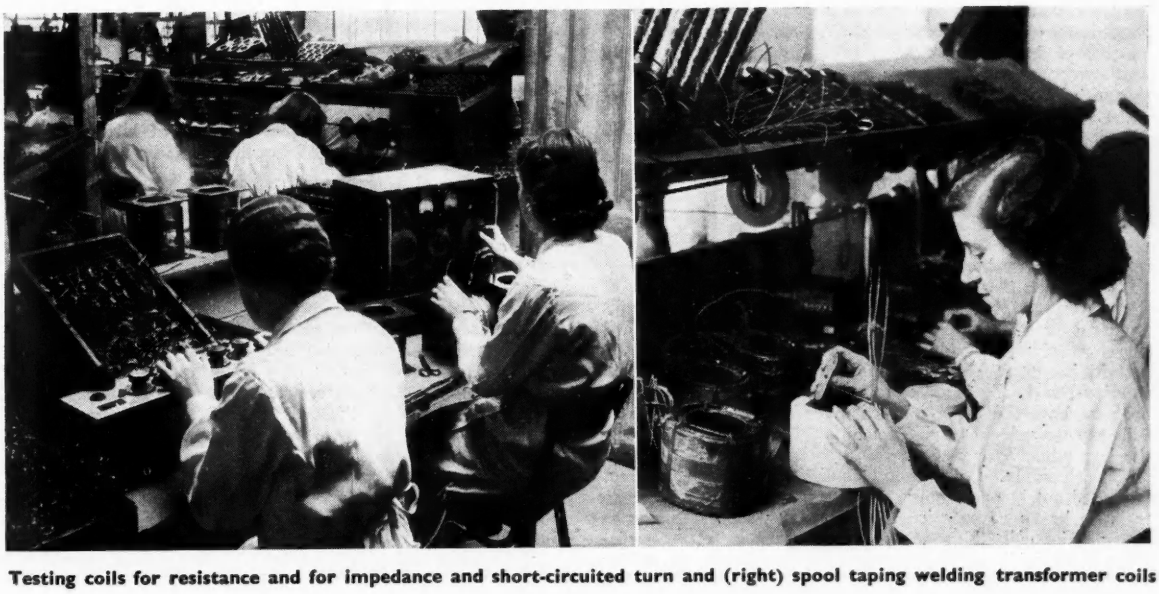

Testing coils for resistance and for impedance and short-circuited turn and (right) spool taping welding transformer coils

DOMESTIC ELECTRIFICATION

Conditions in Great Britain and U.S.A.

By H. Shackleton*

FROM time to time, various articles have appeared in the technical Press dealing with electrical development in Great Britain and in the United States. Accurate comparison of progress in the two countries, however, has proved a matter of some difficulty owing to lack of statistical data, and comparison has only been possible on very general lines. Reliable particulars of domestic consumption in Great Britain have been very difficult to obtain in the past, but the latest Return of the Electricity Commission contains some very useful information regarding domestic electrification. Included for the first time is a Summary Table No. 37, which gives an analysis of consumers and sales of electricity to and revenue received from domestic premises. Similar information for the United States has been published annually for many years, so that a more reliable comparison of development in the two countries is now possible.

It should be mentioned that Table No. 37 referred to above does not cover the whole of the domestic consumers in Great Britain, information being available for the following proportions of total number of consumers only—84.5 per cent. for the year 1935/36, 92.5 per cent. for 1936/37, and 92.8 per cent. for 1937/38. Figures in the following tables have therefore been adjusted where necessary on the assumption that the undertakings included in the Return are characteristic of the whole. The error introduced thereby will probably not affect the overall figures to any appreciable extent, particularly since the more important comparisons refer to the year 1937/38, when authorised undertakers supplying approximately 7.2 per cent. only of the total number of consumers failed to furnish the necessary information.

Number of Consumers

Table 1 shows the number of domestic consumers in Great Britain and the United States at the end of each of the last three years. Particulars relating to America have been taken from "The Electric Light and Power Industry in the United States" Statistical Bulletin No. 5 (1937), published by the Edison Electric Institute.

TABLE 1

Country	Great Britain			U.S.A.		
Date	31.3.36	31.3.37	31.3.38	31.12.35	31.12.36	31.12.37
Population (millions)	45.60	45.80	46.00	127.521	128.429	129.257
Domestic consumers:						
Millions	6.557	7.336	8.091	20.446	20.987	21.698
% of population	14.38	16.02	17.59	16.03	16.34	16.79

It will be seen that the number of residential consumers expressed as a percentage of population was 17.59 for Great Britain at March 31st, 1938, against 16.79 for the U.S.A. at December 31st, 1937, although at March 31st, 1936, the figure for Great Britain was only the same (14.4 per cent.) as that obtaining in America early in 1927. The rapid increase in number of domestic consumers in Great Britain during the past two years has been attained mainly through the connection of a large number of consumers of the low wage earning class. Quite apart from the present abnormal situation, the rate of connection of new consumers will inevitably fall in the future, since a large proportion of the premises near distribution mains have now been connected. The provision of a supply to many of the remaining premises will involve relatively high capital expenditure, which cannot be justified at the present time.

*Manchester Corporation Electricity Department.

Annual Consumption

Table 2 shows for each of the last two years the total annual domestic consumption in the two countries, the annual consumption per head of population, together with the annual consumption per consumer based on the average number taking supply during the period.

TABLE 2

Country	Great Britain		U.S.A.	
Year	1936/37	1937/38	1936	1937
Average number of domestic consumers—millions	6.947	7.713	20.611	21.276
Total domestic consumption:				
Million kWh	4,008.6	4,623.9	14,992.1	16,875.5
Per consumer—kWh	577	599	727	793
Per head of population—kWh	88	101	117	131

It is interesting to note that although a large number of small consumers were connected in Great Britain during the year 1937/38, the annual consumption per consumer exceeded the corresponding value for the previous year. Considerably increased use of electricity must therefore have been made by existing consumers, probably for cooking and water heating purposes. Domestic consumption per head of population increased during the same period from 88 to 101 kWh.

Higher values of consumption were experienced in the United States than in Great Britain, the excess being 32.2 per cent. for domestic consumption per consumer and 29.7 per cent. in the case of domestic consumption per head of population. Many explanations have been offered during recent years for the higher consumption obtained in the U.S.A., but it is felt that a comparison with the detailed information given by Mr. C. W. Kellogg in his paper entitled "Supply of Energy for Household Purposes in the United States," and presented at last year's Vienna meeting of the World Power Conference, will perhaps be of interest, and may enable more definite conclusions to be drawn.

Use of Appliances

In Table 3, estimates of the number of appliances in use and annual consumption per appliance are shown. Particulars relating to America are those given by Mr. Kellogg in the paper referred to above, while particulars of the numbers of appliances in use in Great Britain are based on returns and estimates published in various technical and trade journals.

It is to be noted that in Great Britain in 1937/38, there was one electric cooker to approximately 6.9 consumers, whilst in the U.S.A. there was one cooker to every 16.1 consumers. The estimated number of consumers per electric water heater in Great Britain was 19.7 against 61.4 in the United States. There is little doubt that the availability of hiring facilites has been largely responsible for the more highly developed

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Coil Winding (*Continued from preceding page*)

just the necessary depth. By making use of these multi-spindle machines a very high rate of production is possible without the disadvantage of excessive winding or operating speeds of the machines. It is, for example, possible to wind ten coils having over 20,000 turns each in eight minutes, each coil therefore taking only four-fifths of a minute to make.

It is, however, found preferable to wind small coils, such as relays, vertically in order to prevent "whip." These, like bobbins, have the paper insulation inserted by hand. Stator coils are wound on special machines, four at a time, while the larger contactor coils, welding transformer coils, &c., are dealt with singly. Coil forming, as distinct from coil winding, is carried out in one corner of the factory, the products made there in heavy gauge wire being used for such purposes as meter series coils, blow-out and instrument coils. A special room is set aside for making meter coils. Resin core solder and resin flux only are employed for making joins in the wire.

A feature of the finishing-off section is that the benches are covered with wire gratings which prevent any wire chippings from being picked up by, and probably damaging, the coils. Vacuum impregnation at 0.1 mm. off absolute or below is standard practice. The coils are first stoved for a minimum of two hours and then placed in a vacuum. The varnish is admitted, a partial vacuum then being used to withdraw the solvent. Stoving for sixteen hours in thermostatically controlled ovens follows, the coils being previously almost dried to obviate boiling the wire in the solvent. The final sealing coat of varnish is sprayed on.

Full facilities are provided for test purposes. Normally coils are flashed at 2,000 V, but high voltage testing is available up to 10,000 V. Routine tests include tests for shorted turns, impedance and resistance. In the last-mentioned test an accuracy to within ±3 per cent. is generally demanded in the factory, though in many cases still less variation is permitted.

state of the electric cooking and water heating loads in Great Britain.

The most striking difference in connections in the two countries is in the field of refrigeration. In the U.S.A. there was one domestic refrigerator to every 2.4 domestic consumers. whereas in Great Britain there were approximately 77 consumers to every domestic refrigerator in use. The more severe climatic conditions, together with more intensive propaganda and high pressure salesmanship obtaining in America have assisted in developing this valuable class of load.

TABLE 3

Country	Approximate Average No. of appliances in use		No. of consumers per appliance		Annual consumption per appliance kWh	
	Great Britain	U.S.A.	Great Britain	U.S.A.	Great Britain	U.S.A.
Year	1937/38	1937	1937/38	1937	1937/38	1937
Cookers	1,120,000	1,370,500	6.9	16.1	1,200	1,200
Water Heaters ...	392,000	360,000	19.7	61.4	2,500	3,300
Radio sets—mains operated	4,628,000	18,200,000	1.7	1.2	80	100
Irons	5,785,000	17,940,000	1.3	1.2	60	80
Refrigerators ...	100,000	9,225,000	77.1	2.4	300	420
Clocks — mains operated	1,543,000	10,355,000	5.0	2.1	18	15

Analysis of Consumption

Using the estimates of numbers of appliances in use and annual consumption per appliance shown in Table 3, it has been possible to analyse domestic consumption so as to indicate the proportion attributable to each type of appliance. The analysis is given in Table 4. It should be mentioned that in Tables 3 and 4 the particulars relating to the United States include farms where little or no irrigation is carried out.

TABLE 4

Country	Great Britain		U.S.A.	
Year	1937/38		1937	
	kWh per consumer	kWh per head of population	kWh per consumer	kWh per head of population
Cookers	174	29.2	74	12.7
Water heaters	127	21.3	54	9.3
Radio sets—mains operated	48	8.1	82	14.1
Irons	45	7.5	65	11.1
Refrigerators	4	0.7	174	29.7
Clocks—mains operated ...	4	0.6	7	1.2
Total for above appliances ...	402	67.4	456	78.1
Lighting and misc. uses ...	197	34.3	349	59.8
Total	599	101.7	805	137.9

From Table 4 it appears that the annual consumption per domestic consumer in Great Britain during the year 1937-38 was 100 kWh more for cooking, 73 kWh more for water heating, and 170 kWh less for refrigeration than in the U.S.A. Our advantage in supplying more energy per consumer for cooking and water heating was, therefore, almost nullified by our smaller sales for refrigeration purposes.

For the six types of appliances listed in Table 4, the total consumption per consumer was 402 kWh in Great Britain and 456 kWh in the United States. For lighting and miscellaneous uses the consumptions were 197 and 349 kWh respectively, making a total annual consumption per domestic consumer of 599 kWh in Great Britain and 805 kWh (793 kWh excluding farms) in America.

Energy used for space heating is included in "Lighting and miscellaneous uses." The use of electricity for residence heating has made little progress in the United States, where the extremes of temperature are such that people who could afford to use electricity for room heating employ central heating installations which serve all or most of the rooms. The consumption per consumer for space heating is estimated by Mr. Kellogg to be approximately 4 kWh per annum.

The conclusion is, therefore, that much more extensive use is made of electric lighting in American homes than we over here are accustomed to make.

Cost of Energy

That the relatively high domestic consumption in the U.S.A. is not attributable to low tariffs will be appreciated in Table 5, which shows revenue per consumer based on the average numbers taking supply during the period, and average return per kWh consumed. The figures for Great Britain are taken from the Annual Return of the Electricity Commissioners and refer to 92.8 per cent. of total consumers, whilst the American particulars are those published by the Edison Electric Institute.

TABLE 5

Country	Great Britain	U.S.A.
Year	1937/38	1937
Average revenue per consumer	£ s. d. 3 16 0	£ s. d. 7 3 1
Average cost per kWh consumed	d. 1.522	d. 2.165

In his article entitled "Statistics and Sales" published in the ELECTRICAL REVIEW of June 9th last, Mr. W. E. Swale stressed the importance of statistics, and referred to the desirability of having detailed and trustworthy information available regarding electricity supply in Great Britain. The Electricity Commissioners now publish a mass of reliable and useful data, but in the field of domestic electrification, which is rapidly becoming of increasing importance to supply undertakers, there are still many helpful particulars which might be made available.

Low-head Water-power Plant

PARTICULARS of an unusual hydro-electric installation at Bobcaygeon, Ontario,were given in a recent issue of *Electrical News and Engineering*. The new plant which was put into operation earlier this year operates under an average head of 5.4 ft. The substructure is of reinforced concrete, 62 ft. by 50 ft. 7 in. by 12 ft. deep. The power house is of cement block 62 ft. by 25 ft. by 19 ft. high.

One complete unit of 187 kVA capacity has been installed, including trash racks, water wheel generator, exciter, and switchboard, which includes equipment for paralleling with existing plant. The water wheel parts for a second unit of equal capacity have also been placed in the substructure.

The water wheel is of the single runner, downward discharge, vertical shaft, high speed propeller type, 216 HP, and operates at 85.7 RPM. A syphon setting, in which parts of the turbine are above the head water level, is employed. With this type of setting an ejector is provided, operating between the water levels, for the purpose of exhausting the air in the top of the wheel case, actually raising the inlet water to a point higher than the level of the pond from which it flows.

The draft tubes are of plate steel flared from 7 ft. 6 in. to 20 ft. diameter, and are approximately 10 ft. in length. The governor is of the latest improved oil pressure type with a rated capacity of 6,700 ft. lb., with a separate pump unit, motor-driven by a 110-V, 60-cycle, 3-phase AC motor.

The generator is rated at 187 kVA, 0.8 power factor, 2,300 V, 3 phase, 60 cycle, 90 RPM. The complete rotating element of the generator is mounted on an extension of the vertical water wheel shaft. This direct connection was possible only by the use of a high speed propeller-type water wheel, since it permits the use of a combined spring thrust and guide bearing, so located as to provide maximum efficiency in the centring of the rotor and stator. An upper bearing can thus be eliminated and a simpler construction results.

The generator, installed by the contract service department of the Canadian General Electric Co., is 10 ft. in diameter and 2 ft. 8 in. in height. Due to this low overall height, it was not necessary to install a crane for the erection, and considerable economies were effected in the construction of the power house.

A heavy flywheel was required, giving a total flywheel effect of 165,000 lb.-ft. The generator employs welded construction throughout, and the frame is made very stiff radially to eliminate distortion and ensure quiet operation. The stator is of smaller diameter than the pit, so the generator frame is mounted on radial arms covered on the outside diameter with Admiralty plate floor.

To provide economy in voltage regulation, a high speed motor-generator exciter was furnished, complete with the necessary switching and protective equipment. The braking system is of the simple hand-operated type.

Damage by Squirrels

IN parts of Montreal the Bell Telephone Co. of Canada has experienced trouble due to damage caused to its cables by squirrels gnawing the sheath and allowing moisture to enter. Telephone engineers experimented for several months to find a way to discourage the animals from chewing the cables. They tried coating the cables with a mixture of soap and white lead, but this had little effect. Finally, they painted the cables with asphalt mixed with sand. The squirrels' feet stuck to the asphalt, and the sand got in their teeth. It was found that no damage was done to cables treated in this way.

I.E.E. Regulations—VI

EARTHING AND TESTING

By H. R. Taunton, A.M.I.E.E.

SECTION 10, on earthing, is prefaced in the new edition by an interesting note. In reviewing this section in the 10th edition, I referred to the "old debate between the 'earthers' and the 'all-insulators'" and, in the interests of uniformity, suggested that both should accept what was practically the new code designed to give authority to the views of the majority in favour of earthing. The 10th edition plumped for it wholeheartedly. It gave no option, unless negatively, to those who clung to the difficult ideal of all-insulation.

It is they who will find the new prefatory note encouraging, particularly the second paragraph, "strongly" recommending (in heavy type) the installation of electrical apparatus of the all-insulated type. Perhaps we shall now see a recrudescence of the old controversy; but it must necessarily end in compromise. A building can be wired in t.r.s. cable and have its every accessory of bakelite, but the all-insulated principle breaks down as soon as the installation is put to use by the attachment of current-using appliances. One cannot, for instance, have an electric iron with an exterior entirely of insulating material.

So earthing we must always have, however it may be disguised by systems of concentric wiring and multiple-earthed neutrals; and, its necessity granted, a stringent code to govern its practice is a necessity as obvious. Partial or defective earthing is worse than none at all, since its dangers are unsuspected.

Earthing, indeed, however thorough, can be a source of danger if other of the Wiring Rules are neglected, as, for instance, by the careless connection of a switch in the wrong conductor; and it necessarily brings that danger into what are defined as "earth-free situations"—which are really only earth-free until the sockets and appliances in them are earthed (as note to Rule 1001A(i)).

Based on Experience

The future may develop some wiring system which will avoid these snags—perhaps on the lines of Major P. A. Smith's interesting paper at the recent E.C.A. Conference—but in the meantime we can only safeguard against them by observance of the precautions which the experience of the industry, reflected in the present rules, has shown to be best fitted to existing practice.

The truth of the matter is, the mixed problem of the protection of electrical installations against both voltage-leakage and excess current is still in the experimental stage. It is to be expected, therefore, that some will find the present rules inadequate, while others, with as much reason, will find them over-drastic. However, like Anderson shelters, universal gas-masks, and the too-complete black-out, their intention is excellent; and where they prove superfluous or unpractical, time and common sense will ignore or correct them, for the *n*th edition of the Wiring Regulations.

Rule 1001, completely revised, is a decided improvement on the old, badly drafted rule. It is understandable, which that was not. It starts with the broad statement that all metal in an installation must be earthed, with certain exceptions which it proceeds, clearly, to enumerate. Exemption (i), of metal in an earth-free situation, is new and sensible, and in practice it will apply to the greater part of domestic and office installations, with their wood or carpeted floors. A reference has been made above to its note. Exemptions (ii) and (iii) are those from Clause B of the old rule. Exemption (iv) covers the first part of its clause C.

Except for a new and useful proviso to (ix), that clips, &c., for flex shall be insulated, the remaining exemptions are either superfluous or petty. No one in his senses is likely to think of earthing insulated screws, or the saddles and cleats of conduits and cables. A pertinent legal tag is: "De minimis non curat lex." It can be loosely translated as "Rules shouldn't fuss over trifles." Clause B is new and good—but how many portable standards are fitted by their designers with means of complying with it? The note should be compared with that to A(i). See also Rules 605C and 607B.

In Bathrooms

Coming to Rule 1002 (bathrooms), we are confronted with a solid page of type in Clause A, representing A and B of the old rule, with a new note and new matter, stipulating that the potential difference between any two points of the pipework in a room shall not exceed 40 V. All this would have been less daunting if it had been reasonably paragraphed; but, in any case, having once ploughed through it, the average contractor or wireman will probably do his best to forget all about it.

The rule is too academic. It is based on perfectly sound theory, but its proposed application is too unpractical to have any chance of observance by any but earthing fanatics; and they will first have the difficult task of persuading the householder and his wife, and their architect and decorator, to accept the disfigurement of a highly finished bathroom by a lattice-work of copper tape. Agreed that the bathroom is one of the few situations in a house which is not earth-free; but if something more than the provisions of Rule 1001 is needed for its protection, something less than the complication of the present rule must be devised, if it is not to remain a dead letter.

The remaining clauses of the rule need no comment. They are straightforward, and little changed from the last edition. Rules 1003 and 1004, too, are as before; and so, broadly speaking, is 1005, with the omission of the old clauses B and C. The new term, "consumer's earth resistance," makes an appearance in clause A, and a useful note has been added to it.

Leakage Trips

We now come to 1006, practically a new rule, although foreshadowed in the 10th edition by Rule 116, now deleted, and 1005C. The rule goes flat out for earth-leakage protection in all installations (with certain exceptions); and the automatic devices to be fitted are such as will operate by limiting the voltage-leakage, and not the current, as suggested in the past. The maximum potential difference between the metal to be protected and earth is given as 40 V, instead of the 50 V mentioned in the former note to 1005D.

The exemptions are important. The first, with its note, is rather indefinite, and, on the face of it, seems to offer a loophole for general evasion of the rule. No. (ii) is much to the same effect as the proviso to the old 116, limiting its application to installations of 100 A or more; while No. (iii), with its reference to the covering regulations of Rule 1001, gives another chance to those who may prefer to avail themselves of it rather than experiment with the overriding rule. In fact, the whole rule, with its following note, suggests that its compilers are feeling their way against the prejudice which, for one reason or another, many contractors have hitherto had against this means of protection—*pace* Mr. T. C. Gilbert, who is far better qualified than I am to criticise (or perhaps, commend) the present rule.

Rule 1007 (water pipes, &c.) replaces the old 1006, with its clause A considerably amended to conform with the general intention of the section. Rule 1008 (earthing leads) is generally as the old rule, with the 1935 amendment, and further amended, like the preceding rule, with reference to earth-leakage protection.

Installation Certificates

Comparison of Section 11, testing, with that in the last edition, is simple, as, with one important exception, there is hardly any difference between them. Rule 1102 is made up of the old 1102 and 1103, and similarly Rule 1103, of the old 1104, 1105 and 1106. With altered numbering, the remaining rules up to 1107 (formerly 1110) are identical with those in the 10th edition. The last rule (1107) is one which calls for the help of a diagram.

The exception to which I have drawn attention above is Rule 1108, an entirely new one. It stipulates that on the completion of an installation a certificate shall be given—to whom is not stated, but one assumes the purchaser—in a form (A), of which the full wording is set out. In addition to the actual certificate, this provides for a numerical detail of the installation; but, curiously, it overlooks switch points. Since these are counted as "outlets" for testing purposes (Rules 1102, 1103), they ought to be recorded. The form further contains a recommendation that the installation shall be inspected and tested at intervals, which, according to the rule, should be of not more than five years. (It is rather paradoxical to make a maximum term obligatory, while the inspection itself can only be optional.)

A detailed form follows, (B), which is to be used to report results—if the consumer accepts the recommendation. As most

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SUPPLY TO SMALLHOLDINGS

Combined High- and Low-voltage Distribution

A RECENT scheme promoted by the Land Settlement Association provided for the purchase of three farms, comprising over 800 acres, which were divided into some 160 holdings averaging five acres. On each holding is a detached cottage, glasshouse, piggery, a Dutch-light structure and a battery-type hen house. The land is planned out for cultivation of fruit and vegetables with concrete roads and access ways to each holding.

Connection to the local supply undertaking's mains by underground cables or by overhead high-voltage lines serving an independent four-wire overhead low-voltage network was considered too expensive, owing to the distances to be covered by the low-voltage distributors. Co-operation with the Rural Department of the Electricity Commission led to the adoption of combined single-phase high- and low-voltage distribution.

The mechanical design of the structures was on the basis of a relaxed ice loading on the high-voltage conductors, ¼ in. instead of the regulation ⅜ in. The Electricity Commissioners have since allowed a still further relaxation from ⅜ to $\frac{3}{16}$ in. ice loading with conductors between the limits of No. 8 SWG and 0.04 sq. in. copper. One side of the high-voltage system is earthed, the lower conductor constituting the neutral return. The installation cost has thus been minimised, while an adequate margin for future loads has been automatically provided owing to the high-voltage supply being carried alongside the l.v. for six miles, or most of the route, thus permitting supplies to be given for both ends of the distributor and improving voltage regulation. With the whole of the smallholdings connected, ample margin is available to cover the anticipated cooking load.

Transformer pole with high- and low-voltage conductors

Advantages of four-wire distribution in rural areas are in most cases discounted by inability to maintain a reasonably balanced load. A single-phase three-wire scheme is more economical, and losses are sometimes less than in a four-wire scheme.

The span adapted was that usual with low-voltage lines, namely 150 ft. Straight-line poles were not much larger than those for standard low-voltage construction, *viz.*, 29 ft. by 9 in., while the terminal and angle poles were for the most part 31 ft. by 9½ in. An inexpensive angle pole was provided with the use of single suspension sets under tension, the angle load being utilised to keep the suspension insulator away from the pole, thus avoiding the use of double tension sets with sectioning.

The high-voltage insulation used on the line comprised a normal pin-type insulator on the live side at straight-line positions, with reel-type insulator at normal voltage to support the neutral, conductor spacing being in general 1 ft. 9 in. Hard-drawn copper has been used for all conductors. Those at 6.6 kV are 0.04 sq. in. in cross section.

The low-voltage circuits were of standard construction and the poles were designed for three 0.06-sq. in. low-voltage conductors and one No. 8 SWG street lighting wire to be mounted above three distribution wires in the future. The distance between the high- and low-voltage circuits is 2 ft. 3 in. on straight-line poles.

No modification of normal construction was carried out at road crossings, with the exception of the increased ground clearances to 19 ft. and the provision of p.b.j. for the low-voltage wires. The majority of services were carried out with 0.0225 sq. in. p.b.j., but for the longer ones 0.04 sq. in. was used.

The high-voltage neutral is earthed only at the main sub-station where bulk supply is transformed from 11 to 6.6 kV, but the steelwork is connected to neutral at every support. On the low-voltage side the neutral is earthed at one point only on a distributor, even when the distributor is connected at more than one point.

For bulk supply transformation 50-kVA, 11/6.6-kV single-phase units were used, and for the multiple distribution 20-kVA, 6,600/460-230-V units, all having ± 2½ and 5 per cent. tappings. Porcelain bushings were used in the case of all voltages.

The transformer tank is connected to a down-going earth lead and continued to an earth-plate whence an underground bare-copper lead is taken to the next pole, connected to another earth-plate and then taken up the pole and connected to the low-voltage neutral. Post Office overhead crossings have hitherto been avoided, and if they are necessary in the future the two neutral wires acting with cross lacing will form a cradle guard.

The whole of the outside multi-circuit distribution and service scheme was designed and carried out by Callender's Cable & Construction Co., Ltd., who also provided technical assistance to the scheme from its inception in co-operation with the Electricity Commission and Mr. R. V. Weare, chief engineer of the supply undertaking. Insulators were supplied by Bullers, transformers by Transformers & Welders, Ltd., and high-voltage outdoor fuses by the English Electric Co.

I.E.E. Regulations (*Concluded from page 420*)

of the clauses in this form end with the words, "except as stated below," it is not intended as a certificate, but rather as a warning. If, again, the consumer accepts it and agrees to the necessary work being done, presumably, on its completion, a second form "B" is to be sent him, with the qualifying words cancelled; and it would then become a true certificate of the satisfactory condition of the installation. This point ought to have been made clearer; otherwise the rule or recommendation remains inconclusive. However, it is a beginning, a welcome innovation. The pity is that such periodical overhauls can at present be no more than "recommended." An Englishman's home is his castle, and all that; and if he elects to live dangerously, it would be a waste of words for the I.E.E. to frame a rule to protect him which contractors would be powerless to enforce without the backing of the special legislation which we can only hope, one day, to have for our Wiring Regulations.

There is a curious phrase in Form A, "construction of the installation," which I can't remember to have seen in print before. It reads awkwardly, because "construct" conflicts with the primary meaning of "installation." The usual phrases are, to "carry out" or "put in" an installation; but, admittedly, these read almost as awkwardly. It is a pretty problem for purists; like that which worries thriller writers, of the exact verb for the operation of a tumbler switch, which we, in the industry, always evade by relating the action to the thing switched on or off.

CONTROL OF METALS

Licensing Arrangements

THE moment war was declared the Government imposed a previously prepared control system over the metals used by manufacturers of electrical equipment. Dealings in raw copper, lead and zinc were immediately suspended on the London Metal Exchange, and it was announced by the Minister of Supply that orders had been made for the control of essential materials such as iron and steel, non-ferrous metals and aluminium. Tin dealings were continued spasmodically, even after a maximum price of £230 was officially fixed on September 18th. The rubber market has not, however, been placed under rigid control like the Metal Exchange. The orders affecting the various metals included the following :—

Non-ferrous Metals

The Minister has undertaken the control of supplies of copper, lead and zinc, and such control will be exercised by a Department of the Ministry entitled the Non-Ferrous Metal Control.

1. The Order prohibits for the time being the purchase of copper, lead and zinc for consumption except under licence (this restriction does not apply, however, to existing contracts in writing or to contracts for the purpose of enabling contracts with His Majesty's Government to be fulfilled, or to the purchase of copper, lead and zinc for the purpose of necessary repairs not requiring more than one ton of each metal).
2. Fixes maximum prices for copper, lead and zinc.
3. Calls for a return of information from persons concerned in the non-ferrous metal trade of stocks of copper, lead and zinc, and certain manufactures of these metals.

The export of unwrought copper, unwrought lead and unwrought zinc and spelter, and of non-ferrous scrap and old metal is being prohibited except under licence from the Export Licensing Department of the Board of Trade.

Aluminium

The control of supplies and prices of aluminium, aluminium alloys, and aluminium scrap will be exercised by a Department of the Ministry entitled the "Aluminium Control." The Order :—

1. Prohibits for the time being dealings in and deliveries of aluminium and aluminium alloys, whether virgin or secondary, except in fulfilment of Government contracts or existing written contracts.
2. Lays down maximum prices for aluminium, aluminium alloys and aluminium scrap.
3. Prohibits the disposal of aluminium scrap except through authorised dealers and smelters.
4. Requires returns of information in regard to aluminium and its manufactures.

The export of raw aluminium and aluminium scrap is prohibited except under licence from the Export Licensing Department of the Board of Trade. Any person who carries on the business of a dealer in or smelter of aluminium scrap who wishes to obtain the necessary authorisation to continue in such business should communicate with the Controller of Aluminium as soon as possible. A list of such authorised dealers and smelters is to be issued.

(N.B.—The provisions of the Order do not prevent a consumer of aluminium from remelting the scrap produced in his own works for re-use in the same undertaking.)

Iron and Steel

Under the Order establishing control of the iron and steel industry licences are required to acquire iron and steel goods and certain raw materials, but provision is made for exemption, by notice, from the necessity to obtain a licence in favour of certain classes of purchasers and/or certain purposes. A notice is being issued concurrently with the Order providing for the exemption of the main classes of first priority users, namely, Government Departments, and purchasers requiring goods for civil defence purposes and railway, shipbuilding and coal mining undertakings. Goods forming the subject of existing contracts are also exempt from licensing but may be subject to certain priorities.

All purchasers of small quantities of goods (not exceeding 10 cwt.) and purchasers from stock-holding merchants (during a period of 14 days from the date of the Order) are also exempt from licensing. No licences are required for dealing in scrap iron and steel.

Maximum prices are established for the principal iron and steel products. The prices scheduled are those current in the industry, and it is contemplated that they will remain unchanged until October 31st.

Addresses of Controls

The addresses of the various metal controls are as follows—

Aluminium: Ministry of Supply Aluminium Control, Raven Hotel, Castle Street, Shrewsbury. Telephone : 2067/8.

Iron and Steel: Ministry of Supply Iron and Steel Control, Steel House, Tothill Street, London, S.W.1. Telephone : Whitehall 1030.

Non-Ferrous Metals (copper, lead, zinc) : Ministry of Supply Non-Ferrous Metals Control, Grand Hotel, 46, Albert Street, Rugby. Telephone : Rugby 2002/3.

Fixed Maximum Prices

The following maximum prices are amongst those now fixed :—

Copper: Rough, unwrought in blocks, slabs or other forms, £46 in warehouse; refined, unwrought, £49 10s. in warehouse; electrolytic, unwrought, £51 c.i.f. U.K. ports; billets, £55 c.i.f. U.K. ports; cakes, £51 12s. 6d. c.i.f. U.K. ports; cathodes, £50 10s. c.i.f. U.K. ports; wire rods, £55 delivered consumers' premises.

Lead: Good soft pig (foreign), £16 12s. 6d. ex ship (duty for buyers' account); Empire, £17 ex ship; good soft pig (foreign), £17 5s. ex warehouse (duty for buyers' account); Empire, £17 12s. 6d. ex warehouse.

Spelter: G.o.b. (foreign), £15 ex ship London (duty for buyers' account) : G.o.b. (foreign), £15 12s. 6d. ex warehouse (duty for buyers' account); Empire, £17 5s. ex ship London; Empire (including domestic), £17 17s. 6d. ex warehouse; domestic, £17 5s. f.o.r. Swansea; high-grade, £18 c.i.f. U.K. ports; high-grade, £18 12s. 6d. ex warehouse.

Zinc Sheets (10 zinc gauge and thicker) : £29 ex works.

Imports and Export Business

The authorities have meanwhile forbidden the importation of a large number of products except under licence.

The institution of the licensing system is, of course, certain to result at first in a diversion of business from private to Government orders, since the State has power to withhold licences for non-essential uses. At the same time, it is apparently proposed as part of a national policy to encourage export business as far as possible, and therefore users of metals will probably find it easier to obtain licences in respect of material needed for export contracts than for non-privileged home consumption orders. The Control will doubtless also direct its energies towards keeping commodity prices in check, but in view of exchange uncertainties and the impossibility of entirely insulating British prices from those ruling abroad, it remains to be seen what success will be achieved in this regard.

At the outset a certain number of difficulties have arisen owing to the institution of control, and the immediate effect has been to slow down business. Even firms with Government contracts to execute have had some trouble in getting supplies of metals owing to uncertainties regarding the issue of licences. However, as the system gets into full working order these anomalies should disappear and the metal trade will doubtless in due course adjust itself to the new conditions.

New Iron and Steel Orders

THE No. 2 Order for the control of iron and steel made by the Minister of Supply on September 22nd supersedes the No. 1 Order to which it is similar. The restrictions upon the sale and purchase of iron and steel are repeated as is the schedule of maximum prices. A new provision enables the Minister to call for information regarding stocks from producers, merchants and consumers of the metal. Certain persons and undertakings are exempted from the requirement of a licence for the purchase of some of the controlled materials required for specific purposes. This exemption includes any public supply generating station in respect of materials required for the purposes of the station. Electric battery manufacturers may obtain manganese ore without licence for the purposes of their business.

The No. 3 Order which was published at the same time prohibits the sale or purchase of certain classes of scrap iron and steel except under licence and fixes maximum prices for these materials. A direction issued under the Order, however, permits, for the time being, the sale and purchase without licence of the materials, with certain exceptions.

PAPER MILL DRIVES

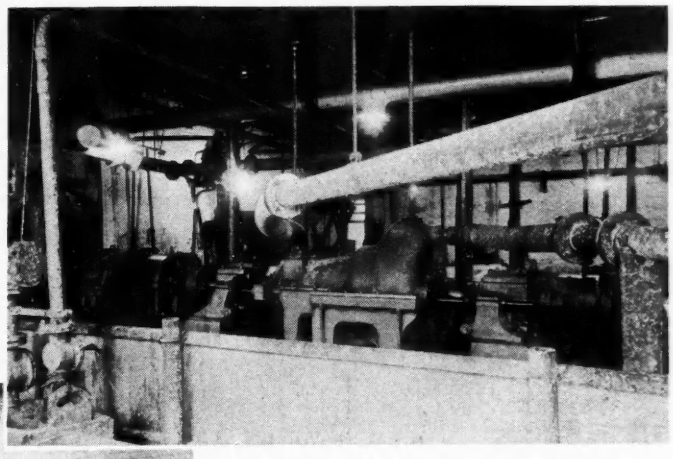
Selection of Motors

IT is an acknowledged fact that the electric driving of paper mills improves the class of paper produced, by rendering it more consistent and cleaner, and imparting a better finish.

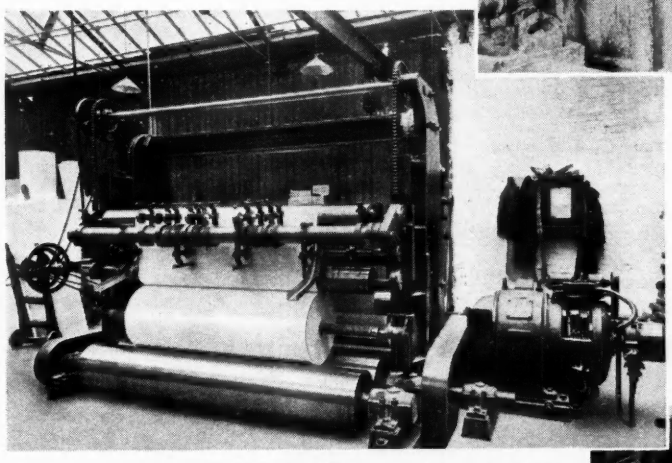
The manufacturing sequence can be divided into (1) preparation of the "stuff," (2) the paper-making machines, and (3) various finishing processes. Constant speed motors satisfy the requirements of group (1) which absorbs from 3.5 to 4 times the power needed by groups (2) or (3) which absorb approximately equal amounts of power and require variable speed motors. Though the paper machine drive may perhaps be the more spectacular, it accounts for only one-sixth of the total power absorbed in the mill as a whole; whereas pre-treatment governs the texture of the paper and subsequent processing determines the degree of finish by which it will be judged by the purchaser.

It should be emphasised that these processing sections of the mill are quite capable of being driven by standard equipment, AC or DC, which is of first importance from the maintenance standpoint, as production is continuous throughout a 132-hour week. But it is not uncommon for the hoses employed to wash down pulp breakers and heaters between fills to be accidentally played on the electrical gear.

For this reason a special form of enclosure developed by the Metropolitan-Vickers Electrical Co., Ltd., incorporates end-brackets with single openings on the top fitted with a cowl which completely encases an apron built up from the opening. In this manner the motor is protected from direct jets, and water can only enter if the hosepipe is directed on the cowl from below the motor. Other precautions include a commodious terminal box so arranged on the motor that water will not collect near it. Cartridge-type ball and roller bearings housings reduce the risk of water getting into the bearing oil, while patent fillers enable the bearings to be easily maintained with the correct quantity of grease. Such features can be fitted to slip-ring and squirrel cage motors, and also to DC machines and the various types of control gear associated with them. In this respect attention is directed to the advantage of the oil-break switch over the air-break type under paper mill conditions.



A 100-HP 1,460-RPM type RW, slip-ring motor driving a refiner through gears



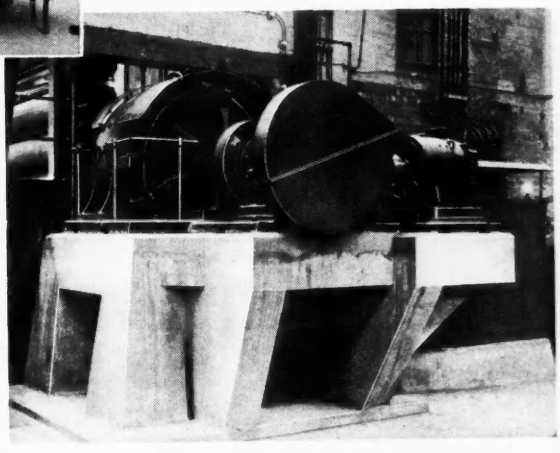
Metropolitan-Vickers 35-HP variable speed commutator motor driving a slitter and reeler

New and Converted Mills

The tendency in modern mills is towards individual drives and modern developments in the construction of pulp beaters have helped this; also, in many mills specialising in one grade of paper made from a certain raw material, it has been found advantageous to beat to a programme of specified ammeter readings for certain periods. In older mills where conversion to electric drive is contemplated the existing layout often lends itself to group drive and it must be remembered that this alternative does retain advantages when the load concerned is reasonably constant and is a high percentage of the rated load. Such advantages are that a higher efficiency can be anticipated, the power factor will be better, and advantage can be taken of the load factor to install a smaller motor; in addition, the motor will then possibly not be placed on the beater floor and therefore be in a cleaner and dryer location.

Beaters require a heavy torque at starting; despite the fact that the roll is raised clear of the bars, 2½ times full load torque is common. This large overload capacity increases the size of the motors and control gear by about 25 per cent. above standard, while the beater roll is usually about 5 ft. in diameter and the most satisfactory beating results with a peripheral speed of 1,700-2,000 ft. per minute. These figures mean that the roll must revolve at about 120 RPM and in order to drive such a roll with a motor of economical size some form of reduction gear must be employed. Belt, vee-rope, or chains have all proved their worth, and the final choice may be left to site conditions or individual preference. In all cases the maximum reduction ratio will be about 5 to 1, which gives a final motor speed of 600 RPM approximately; on a 50-cycle supply this can be obtained with a 10-pole motor.

The starting conditions are so arduous that a squirrel cage induction motor will draw about six times full load current from the line in order to meet this requirement; few public supply authorities will permit such a starting load, though with a private source of generation of reasonable capacity there is no great disadvantage in this so long as the voltage of the supply is not affected to an extent which will cause other apparatus on the line to fall out of step. An induction motor with a wound rotor



Super-calendar drive through a 250/100-HP, 510/205-RPM motor. A 20-HP 750-RPM barring motor is provided, driving through reduction gears, with an overrunning satchet type coupling. The paper speed is 800/2,000 ft. per minute

will, however, start against the torque specified with between 2½ and 3 times full load current; for this reason, although more expensive, it is to be preferred, but on this duty will have to run for long periods continuously and therefore gear for lifting the brushes from the slip-rings and short-circuiting the rings should be included. A further advantage of the slip-ring motor is that it is a simple matter to arrange for the control gear to inch the roll round slowly.

The maintenance of a high overall power factor is of considerable importance in beater installations, for when power is bought from an external source its price will be based on a kVA rate and even when power is produced privately, though the alternator may be chosen for a lower power factor, the advantage will lie in reduced size of cables or the ability to add further load to existing cables when these are already fully rated. The beaters are on almost continuous load and take the bulk of the power absorbed by the mill and are therefore suitable for power factor correction by a static condenser on each motor, or the use of synchronous induction motors on a proportion of the drives.

For refiners with individual drives, a high speed motor and reduction gear will often show a saving over the more usual method of direct-coupling a low speed motor.

The finishing processes differ in so far as they require varying speeds depending upon the type of paper and degree of finish being imparted. Therefore AC commutator motors, Ward-Leonard control, or buck and boost methods are suitable. These drives in general have a nearly constant torque characteristic and this affects the condition in which the paper leaves the mill. Cleanliness and even temperature are therefore vital requirements, both which are met better by individual motors, and admit of a standard type enclosure being employed. Contactor control gear with push-button operation alongside the machine is almost universally used. Instantaneous stopping is usually essential.

When dealing with the finished paper the machines must be capable of turning at a feeding speed to enable the operator to feed the paper through the nips of a calender, or over the rolls of a reeler and slitter, etc., subsequently accelerating as quickly as possible without causing sufficient tension in the paper to tear it. Refinements can be introduced which limit the tension in the paper to any preset value and which maintain that tension automatically throughout the whole reeling period. Various other ways of controlling the finishing processes have been devised and put into operation by the Metropolitan-Vickers Company, which points out that each mill will have its own particular problems requiring individual consideration, including the installation of a pass-out turbo-alternator whereby the large amount of process steam required is first utilised in the high pressure stages of the turbine before passing to the mill; in this way electrical power can be generated at quite low cost.

Swiss Electrical Trade

Principal Participating Countries

THE following table, based on the recently issued Swiss foreign trade returns, shows the principal electrical imports and exports during last year, with notes of increases or decreases compared with 1937, in addition to the chief countries of origin or destination. The values are in Swiss francs, which stood at about 21 to £.

It will be noticed that a large increase took place in the exports of all the leading lines. The rise in dynamo-electric machine exports amounted to just over 25 per cent., while there was an increase of about a third in the exports of the heavier unspecified apparatus. A large advance in the telegraph and telephone business was due to an important contract for Iran; on balance, however, Switzerland is an importer, not an exporter, in this group.

Another noteworthy feature of Swiss electrical export trade is the diversity of the markets.

On the import side the outstanding increases were in telegraph, telephone and radio apparatus. The wire and cable business was also active. The share of the United Kingdom throughout was poor.

Exports	1938 Sw. frs. (000)	Inc. or dec. on 1937 Sw. frs. (000)
Accumulators—		
Total	524	+ 239
To France	73	+ 9
,, Canada	8	− 11
,, Italy	31	+ 23
,, Germany	169	+ 139
,, Finland	101	+ 64
Insulators—		
Total	351	+ 53
To Eire	3	− 5
,, United Kingdom	159	− 38
,, Holland	46	+ 30
Meters and measuring instruments—		
Total	13,420	+ 67
To France	1,822	− 1,054
,, Belgium	1,574	+ 113
,, Holland	1,978	+ 488
,, United Kingdom	1,578	+ 106
,, Italy	659	+ 41
,, Czechoslovakia	822	− 202
Telegraph and telephone apparatus—		
Total	1,440	+ 861
To Italy	140	+ 40
,, Belgium	26	− 85
,, Great Britain	43	− 69
,, Iran	807	+ 762
,, Holland	104	+ 72
Radio apparatus—		
Total	552	+ 52
To France	28	− 5
,, Germany	40	+ 19
,, Holland	87	− 137
Glass rectifiers, with or without mercury—		
Total	43	− 45
To Belgium	9	− 14
,, United Kingdom	7	− 19
Unspecified electrical apparatus, over 500 kg.—		
Total	3,661	+ 943
To Canada	247	− 9
,, France	284	− 137
,, Belgium	296	+ 236
Unspecified electrical apparatus, 50 kg. to 500 kg.—		
Total	2,668	+ 414
To France	383	− 65
,, Holland	177	− 31
,, India	83	+ 49
,, Italy	105	− 13
,, Argentina	118	+ 33
,, Australia	46	− 56
,, Belgium	243	+ 84
Unspecified electrical apparatus, 3 kg. to 50 kg.—		
Total	4,198	+ 153
To France	722	+ 16
,, India	127	+ 65
,, Italy	409	+ 7
,, Belgium	201	+ 40
,, Holland	305	− 20
Unspecified electrical apparatus, under 3 kg.—		
Total	1,396	+ 52

Exports—*contd.*	1938 Sw. frs. (000)	Inc. or dec. on 1937 Sw. frs. (000)
Dynamo-electric machines—		
Total	21,407	+ 4,566
To France	1,997	+ 10
,, Italy	2,637	+ 1,634
,, Belgium	707	− 161
,, Holland	944	− 420
,, Canada	1,046	− 325
,, Argentina	1,013	+ 438
,, Brazil	567	+ 73
,, India	1,351	+ 326
,, Germany	855	+ 385
,, Peru	398	+ 118
,, United Kingdom	226	− 496
Electric locomotives—		
Total	3,044	+ 2,998
To Holland	1,527	+ 1,527
,, Rumania	1,091	+ 1,091
Insulated wire and unarmoured cable—		
Total	562	− 115
To Italy	57	+ 5
,, France	21	− 67
,, Belgium	97	− 26
,, United Kingdom	90	− 29
Cable, not lead covered—		
Total	165	− 29
To France	29	− 32
Electric incandescent lamps—		
Total	566	+ 135
To Germany	521	+ 126
Electric lighting installations for motor cars, motor cycles and cycles—		
Total	885	− 190
To Holland	580	− 75

Imports

Accumulators—		
Total	320	− 44
From Germany	140	− 8
,, France	102	—
Insulators—		
Total	223	+ 48
From Germany	83	+ 27
,, Denmark	82	+ 14
Meters and measuring instruments—		
Total	1,419	+ 88
From Holland	147	+ 39
,, Great Britain	92	− 20
,, United States	133	+ 11
,, Germany	846	+ 72
Telephone and telegraph apparatus—		
Total	2,474	+ 1,133
From Germany	557	− 16
,, Belgium	1,786	+ 1,174
Radio apparatus—		
Total	5,939	+ 719
From Germany	2,033	+ 423
,, Holland	1,685	+ 21
,, United States	822	+ 32

Imports—*contd.*	1938 Sw. frs. (000)	Inc. or dec. on 1937 Sw. frs. (000)
Glass rectifiers with or without mercury—		
Total	33	− 10
From Holland	14	+ 2
Unspecified electrical apparatus, over 500 kg.—		
Total	83	+ 46
From Germany	20	+ 9
Unspecified electrical apparatus, 50 kg. to 500 kg.—		
Total	260	+ 105
From Germany	89	+ 34
,, France	29	− 6
,, Great Britain	109	+ 106
Unspecified electrical apparatus, 3 kg. to 50 kg.—		
Total	477	+ 81
From Germany	221	− 20
,, France	94	+ 38
,, United States	44	+ 20
Unspecified electrical apparatus, under 3 kg.—		
Total	1,018	+ 73
From Germany	749	+ 8
,, France	116	+ 21
Dynamo-electric machines—		
Total	2,048	+ 134
From Germany	789	− 1
,, France	324	+ 61
,, Italy	169	+ 19
,, Holland	147	+ 49
,, United Kingdom	285	+ 79
,, United States	146	+ 21
Lighting and starting equipment for motor vehicles and cycles—		
Total	1,346	+ 147
From Germany	867	+ 96
,, France	136	+ 38
,, United States	123	− 22
Insulated wire and unarmoured cable—		
Total	265	+ 89
From Germany	55	− 10
,, France	8	− 1
,, Holland	74	+ 42
,, Italy	53	+ 17
Cable, not lead covered—		
Total	445	+ 131
From Germany	190	− 9
,, Belgium	181	+ 133
Cable, lead-covered—		
Total	128	− 220
From Germany	102	− 199
Electric incandescent lamps—		
Total	2,396	− 66
From Germany	522	+ 47
,, Holland	1,111	− 8
,, Hungary	442	+ 65

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

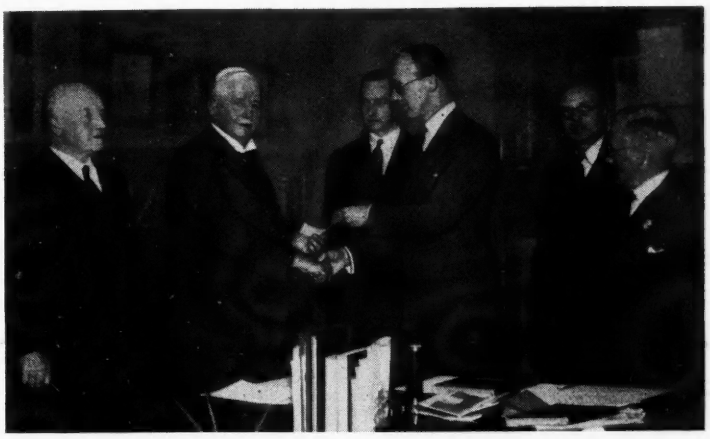
WE are glad to learn that **Mr. A. G. Beaver,** managing director of the Sun Electrical Co., Ltd., together with Mrs. Beaver and Mr. R. J. Rawlings, another director of the company, returned safely from New York last week-end after an extended trip through Canada and the United States. Mr. and Mrs. Beaver sailed in the *Manhattan*, and Mr. Rawlings in the *Georgic*.

Another recent arrival from the United States is **Mr. L. C. Penwill,** director of the Electrical Contractors' Association.

The Faraday House Old Students' Association announces the cancellation of its annual dinner, which was to have been held at the Savoy Hotel on October 20th. In consequence of this, the jubilee presentation from old students all over the world to **Dr. A. Russell,** advisory principal, to mark the fiftieth year of the College and of Dr. Russell's association with it, took place at the Council meeting on September 20th.

The president, Mr. F. Smith, M.I.E.E., general manager of the M. O. Valve Co., Ltd., presented Dr. Russell with a Ferranti television set, a gold signet ring and a cheque. He congratulated Dr. Russell on his long career at Faraday House, and on the success of his personal work in training engineers.

In reply, Dr. Russell told of his pleasure in seeing his old friends there, and particularly welcomed the hon. treasurer of the Association, Mr. H. Foulds, secretary and advisory director of Callender's, who was secretary of Faraday House in days very nearly as early as his own. Speaking of his own work, Dr. Russell said it had been a labour of love and he had found happiness and content in watching the careers of so many fathers and sons. He also expressed deep appreciation of his students' affection, and said that he could not imagine any gifts which would have pleased him more.



The presentation to Dr. A. Russell, showing (left to right) Mr. H. Foulds (hon. treasurer), Dr. A. Russell, Mr. C. Kibblewhite (vice-president), Mr. F. Smith (president), Dr. W. R. C. Coode-Adams (vice-president), and Rev. L. Van Vestraut (hon. secretary)

Mr. R. B. Thom, mains draughtsman in the Electricity Department of Eccles (Lancs) Corporation, was married recently at the Patricroft Parish Church to Miss Vera Fitton.

Mr. E. S. Harris, showroom manager with the Aldershot Borough Council Electricity Department, was married on September 2nd in London, and to mark the occasion he has been presented with an electric clock by Mr. K. W. George, borough electrical engineer, on behalf of the staff of the electricity showrooms and works. Before going to Aldershot Mr. Harris was for six years on the sales staff of the County of London Electric Supply Co., Ltd., and was previously in the mains and consumers' department of the Finchley Urban District Council and the head office, engineering department, of the General Electric Co., Ltd.

Mr. Waldo Maitland, A.R.I.B.A., Comp., I.E.E., lighting consultant, has moved temporarily to 26, Regent's Park Road, London, N.W.1.

Mr. C. F. McInnes, M.I.E.E., Gravesend's first borough electrical and consulting engineer, is retiring. Mr. McInnes, who has been borough electrical engineer of Gravesend for thirty-seven years, was educated at Wyggeston School, Leicester, and at Battersea Polytechnic. For a time he was manager for Calvert & Co., engineers, of Manchester, and later was chief engineer and manager of the Llanwrst Electricity Supply Co. He then became chief engineer and manager to Rhyl Urban District Council, prior to his appointment at Gravesend in 1902. He was responsible for the erection of public electricity supply stations at Llanwrst, Rhyl, and Gravesend. As we announced earlier this year **Mr. N. Elliott** succeeds Mr. McInnes at Gravesend.

Mr. C. F. McInnes

Mr. F. E. Heppenstall, B.Sc., A.M.I.E.E., mains superintendent of the Newcastle & District Electric Lighting Co., Ltd., was married on September 16th at St. George's Church, Gateshead-on-Tyne, to Miss Doris M. Davison.

Miss C. Haslett, C.B.E., Comp. I.E.E., was elected president of the Women's Engineering Society at the annual meeting held on September 23rd. Miss Haslett was specially nominated by the vice-president, **Miss G. L. Entwistle,** A.M.I.E.E. (who should herself have been president for 1939-40) in view of the fact that this is the coming-of-age year of the Society. Twenty-one years ago Miss Haslett became the first secretary of the Society, after experience with a boiler making firm, and she has controlled this side of its work ever since. As Director of the Electrical Association for Women Miss Haslett has been instrumental in opening up a new career for women in the field of domestic electrification, and in the same capacity she is a member of many electrical committees. She has addressed meetings of the World Power Conference held in several countries and has also addressed large audiences in America. Moreover, as vice-president of the International Federation of Business and Professional Women she has gained a worldwide reputation. The Women's Engineering Society was formed as a result of the last war to retain for women the right then gained of serving the nation and the community in the way best possible to the individual.

A. C. Cossor, Ltd., announce that **Lord Glenconner, Sir Connop Guthrie** and **Mr. Allan Miller,** have joined the board of directors.

Sir Albert J. Bennett has been elected chairman of Ransome & Marles Bearing Co. to fill the vacancy caused by the death of Mr. V. S. Woods.

After seventeen years in the electrical department of the Murton Colliery, Co. Durham, **Mr. T. Rutherford** has secured an appointment at Dunston Garesfield Colliery.

Mr. G. W. Germain, who originally joined the staff of the Junior Institution of Engineers in 1911, has been appointed to succeed the late Mr. H. G. Riddle as secretary of the Institution as from October 1st.

Mr. R. H. Holmes, chief clerk and accountant to the Leeds Corporation Electricity Department, is retiring to-morrow (Saturday) on attaining the age of sixty-five, after forty-five years' service. A presentation was made to him on Saturday last on behalf of his colleagues.

OBITUARY

Mr. W. S. Wreathall.—The death occurred on September 17th at the age of sixty-one of Mr. William Simpson Wreathall, a director of the British Electric Traction Co., Ltd., and a member of the British Electrical Federation. He was chairman of the National Electric Construction Co., Ltd., and chairman or a director of a number of transport companies. The cremation took place at Woking Crematorium on September 21st, and was attended by a large number of men representing the companies with which he was connected.

Mr. J. H. Warren.—We regret to learn of the death, at the age of twenty-three, of Flying Officer John Henry Warren, son of Mr. Hugh Warren, of Dunchurch, Rugby, a director of the British Thomson-Houston Co., Ltd. Mr. Hugh Warren is head of the Research Department and his son worked with him. Flying Officer Warren had been married only three weeks before his death.

Will.—Mr. John Gray Chrystal, managing director of Sparks Electrical Engineering Works, left personal estate valued at £10,982.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

Electricity Rationing

From time to time one notes paragraphs in the daily Press implying that some particular supply authority deserves a pat on the back from the general public because of a decision "not to increase prices at the present time," which is very laudable. Now, however, a particularly valuable type of consumer is about to receive a severe shock, and it is time for the matter to be ventilated.

I am charged on the "household rate," paying a fixed charge of £2 5s. per quarter and 0.6d. per kWh consumed. I use 4,800 kWh a year at a total cost of £21, therefore each kWh costs me 1.05d. I am now told that I can only use 75 per cent. of last year's total, which will be 3,600 kWh, but I do not get a corresponding reduction of 25 per cent. on my fixed charge, and therefore each kWh will now cost me 1.2d., an advance of 0.15d. per kWh for the use of a much restricted service.

The reason for the enthusiasm of the electricity supply authorities for wartime rationing is now becoming apparent, as providing a much better average price for residential or domestic supplies than they could hope to obtain by normal trading methods. "THE MORE YOU USE, &C."

September 25th, 1939.

Lighting Restrictions

I was interested in your remarks on page 380 of the ELECTRICAL REVIEW of September 22nd where you state that there is a case in inland towns for limited street lighting "which could be switched off immediately aircraft were detected approaching the coast."

I understand from my colleague, the gas engineer, that they are unable to do this, therefore any such switching off would be confined to electric street lighting. When I proposed to put in a system for doing this some months ago it was pooh-poohed at a well-attended official meeting addressed by a senior and responsible A.R.P. officer from the Home Office. Moreover the Electricity Commissioners have stated that they are not prepared to sanction loans to cover anything of this nature. Unless and until the Home Office presses for it and the Electricity Commissioners support it, it does not appear likely that such a recommendation as you make, sound and sensible as it is, can be acted upon.

In the next paragraph on the same page you state that at Renfrew it was decided to ask the contractors to carry on with street lighting extensions with all possible speed. I have had some street lighting extensions in hand but a circular, first of all from the Treasury and then from the Electricity Commissioners, put an absolute stop upon any capital expenditure that was not directly connected with the prosecution of the war, A.R.P. or Civil Defence. It is true that Renfrew is in Scotland, but the instructions refer to the whole run from John O' Groats to Lands End. C. H. YEAMAN.

Stoke-on-Trent, *September 25th*. Electrical Engineer.

Household Tariffs

Mr. Pointon, in his letter to the ELECTRICAL REVIEW of September 1st, urges the use of demand indicators for dwelling houses in order to arrange an equitable tariff. This method does not work in practice as it makes consumers afraid of using their current freely. If a friend comes in for the evening and an extra fire is switched on the consumer may find that his account is increased although when the bill comes in he has forgotten the extra load and he receives the impression that the charges for current are so erratic that there is no understanding them. The demand system also takes no account of diversity factor. One might as well arrange a tariff for trains and buses by which every passenger was weighed and measured before being allowed to travel and the fare calculated accordingly.

Electricity should follow the methods which insurance companies have found so satisfactory; they cannot calculate the accurate tariff for a single life and often lose heavily on unfortunate persons who die shortly after insuring themselves, but they work on averages and do well out of it. The two-part tariff on a suitable basis causes people to use their electricity freely and that makes for diversity. A house has a party and lights and warms more rooms than usual, but the guests are not using so much electricity at their homes and the station does not suffer; indeed, it is well known that station load curves are very regular in their shapes.

What about the increased demand for a cold snap? Possibly the Central Board may mitigate its charges for such abnormal loads, but even if it does not it is better to use reserve funds to meet such costs, remembering that in other years the demand is lower than normal owing to the dark days being mild. It may be doubted if floor area is suitable in all cases; it works for new housing areas where the houses are small but it fails for old areas where the houses are large and often with small families. Tariffs must be adjusted to the special conditions of the district. M.I.E.E.

September 18th.

The Electric Fire's Role

Permanent injury may be done to the appliance section of the industry by the wholesale condemnation of the use of electricity for fires, water heaters, &c. Whilst electricity must be rationed, it seems there will still be a use, even in war time, for electric fires. Quite apart from special services, such as air-raid wardens' posts, A.F.S. stations and the like, on account of a large number of people being employed during irregular hours, electric fires for occasional heating will be in great demand.

An interesting sidelight on the use of an electric fire in wartime, is provided in the review of a recently published memoir of Mrs. Woodrow Wilson. Reference is made to the fact that the President and Mrs. Wilson arrived in England on a bright cold day in December, 1918, when King George V and Queen Mary personally escorted them to their rooms at Buckingham Palace. Concerning this, she says:—

> "My husband's bedroom had a large alcove cut off by heavy curtains. His Majesty lifted one of these to disclose a well-equipped bath and a small electric heater. This last proved a life-saver on account of the shortage of coal. My room was enormous, with the largest bed I ever saw. It contained no heat at all . . . ."

W. V. BUTTERFIELD, *Manager*,
Domestic Appliance Department,
Ferranti, Ltd.

Moston, Manchester, *September 19th.*

Relieving Black-out Measures

Our streets are suffering every day from black-out "hangover." Our protective measures, strips of paper, drab boarding, generally in dull colours, are making our shopping streets dismal. We have lost the lights of London; but some attempt should be made to relieve the depressing effects of black-out by day.

There are hundreds of able artists and designers in this country, and shopkeepers might turn protection to good account by employing competent people to decorate their defences. The plate-glass window may have given way to peepholes cut in boarding, but there is no reason why the surface of boarding, and even paper strips pasted on windows, should not be invigorated with appropriate decoration, and derive benefit from colour and interest from pattern. This would lift depression from our shopping streets, and might well stimulate business.

M. L. ANDERSON, *Organising Secretary*, Design and Industries Association.
T. A. FENNEMORE, *Registrar*, National Register of Industrial Art Designers.
JOHN GLOAG.

London, W.1, *September 25th.*

Tungsten Filament Lamps

A REVISION of B.S.555 for tungsten filament electric lamps for such special purposes as train lighting (gas-filled), bus, navigation, road traffic control signals, and double-capped tubular lamps, has just been issued by the British Standards Institution. This puts the specification on to the same basis as the revised B.S.161, relating to the construction of tungsten filament general service electric lamps, which was published in 1937.

As it was not possible to put traction series burning lamps on to this basis, a separate specification, No. B.S.867, has been issued, but no change has been made at all in the specification. The text is exactly the same as that originally used in B.S.555, and the schedules are unaltered.

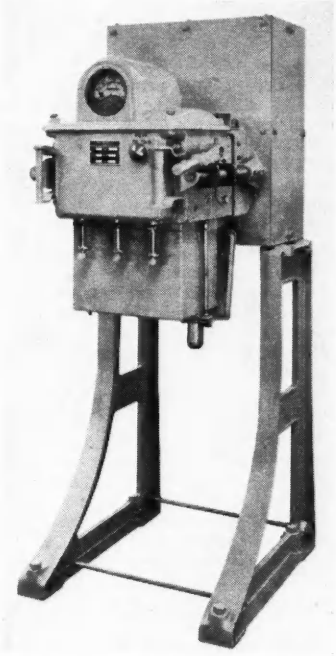
Copies of this revision (B.S.555, 1939) may be had from the British Standards Institution Offices, 28, Victoria Street, London, S.W.1, price 2s. 2d., post free.

NEW ELECTRICAL PRODUCTS

A Review of Equipment Recently Marketed

Circuit-breaker Improvements

THE POWER EQUIPMENT CO., LTD., Kingsbury Works, The Hyde, Hendon, N.W.9, announces a range of totally enclosed iron-clad industrial-pattern draw-out and non-draw-out type "EO" oil-immersed circuit-breakers, suitable for use on AC systems up to 660 V and available in a range of current-carrying capacities from 30 to 600 A. The circuit-breakers are applicable for wall, switchboard or floor mounting, while their standardised construction, embodying the maximum degree of flexibility and interchangeability, enables them to be assembled in iron-clad switchboards of sufficient variety to cover practically all industrial requirements.



"EO.1" 150-A draw-out pattern circuit-breaker arranged for floor mounting

Models are available for double-pole, triple-pole, and triple-pole with neutral link. As single units they can be used as direct-on-line starters for squirrel-cage induction motors where it is not necessary to cut out the over-current releases at starting. They can also be employed as stator switches in conjunction with electrically interlocked rotor starters for the control of slip-ring induction motors.

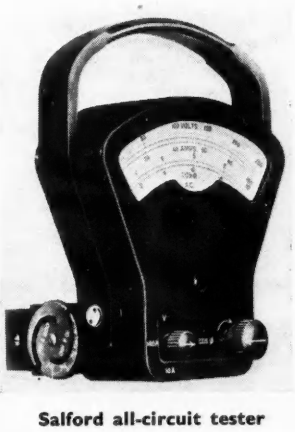
Various combinations of protective devices can be incorporated, including one, two or three over-current releases, under-voltage release, shunt trip, electrical interlock, earth leakage, and reverse current cable protective systems.

A noteworthy feature, incorporated throughout the range, is the use of stationary contacts of special design. Formed from hard-drawn, high-conductivity copper, these give a high pressure line contact; have a self-clearing wiping action and hemispherical seating; and are reversible (giving double life) and easily replaceable and adjusted. There are no flexible tails or loose connections.

All-circuit Tester

With a new all-circuit tester brought out by SALFORD ELECTRICAL INSTRUMENTS, LTD., Peel Works, Silk Street, Salford, it is actually possible to take direct measurements of voltage, current and power factor in as short a time as 20 seconds without breaking the circuit, whereas with the usual types of instrument one would be fortunate to do this in 20 minutes, apart from the necessity for breaking the circuit.

The instrument can also be used to measure AC magnetic fields, for the detection magnetically of faulty windings and for the measurement of AC ripple on DC supplies, and with certain small accessories, its range may be extended to give full scale reading for 100 millivolts and 1 ampère AC. Accuracies of ± 1 per cent. for voltage, ± 2 per cent. for current, ± 2 per cent. for power factor from 0.4 to unity and ± 3 per cent. for power factor from 0.1 to 0.4 are claimed. To carry out the same measurements with equal accuracy the necessary voltmeters, ammeters and wattmeters might cost about five times as much.



Salford all-circuit tester

The tester comprises an open core transformer the limbs of which project at the back of the instrument so that they may be placed astride the current carrying conductor. A secondary winding provides the necessary very small current to operate a moving-coil instrument through a full-wave metal rectifier. The voltage circuit is normal, the moving element and rectifier being fed through series resistances in the usual way.

Two voltage ranges, 0/250 and 0/500, are provided and four standard current ranges, namely 10, 20, 100 and 200 A. With a standard instrument it is also possible to take approximate readings of much larger currents. For current measurements on circuits, over 750 V AC, a special extension handle can be supplied enabling it to be used on high-voltage lines up to 60 kV.

The current, voltage and power factor ranges are chosen by means of a small switch on the front of the instrument. For power factor measurements an additional winding on the transformer, which is normally open-circuited, is placed in series with the voltmeter winding by means of the range switch. The vector sum of the magnetic fluxes, due to the current and voltage enables the instrument to indicate single- or three-phase power factor and hence power and reactive VA.

Artificial Daylight Units

In the past, all forms of artificial daylight depended upon the filtering of light from a tungsten filament lamp. While this method can give good results under ideal conditions, it suffers from three serious drawbacks. The colour composition of the light from a tungsten lamp changes with different mains voltages, so that even normal fluctuations in the electricity supply result in a variation of the colour of the filtered light. As tungsten lamps age, the proportion of red in their light output increases. Moreover, the large proportion of red light given by a tungsten lamp makes it necessary to use a filter with a high absorption which gives such fittings a very low overall efficiency.

"Claudgen" portable artificial daylight unit

In new units introduced by CLAUDE-GENERAL NEON LIGHTS, LTD., Pitman House, Parker Street, London, W.C.2, the light is produced by a discharge through gas without the use of any filters. Thus all the light emitted is put to good use. The colour of the light derived from the electric discharge principle is independent of any normal voltage fluctuations and also does not vary with the life of the unit. It can be relied upon, therefore, to give accurate colour matching under all conditions. In fact, many industrial applications of this form of lighting have proved so satisfactory that they are used to the exclusion of all natural daylight, the variability of which makes it unreliable.

One of the new units is a small portable 250-W model, particularly suitable for shop counters. It consists of a cellulose enamelled metal case containing the transformers and on the top of this, which is finished in chromium plate, samples can be placed for comparison. Two chromium-plated tubes at the back of the transformer case carry the housing which contains the discharge tube to a convenient height above the base. The lead coated sheet steel housing can be finished in various colours.

The other unit, for permanent installation, has a loading of 1,100 W and is designed to provide artificial daylight over a reasonable area of a bench. It can be made complete in the works and assembled on site.

The equipment consists of two main parts—the tube in its reflector casing and an iron-clad transformer unit. The U-shaped discharge tube is 56 in. long and is housed in a trough-shaped reflector fitted with brackets for wall fixing. When the unit is placed 2 ft. above the bench an illumination of 30-40 ft.-candles is obtained.

Flame-proof Instruments

FERRANTI, LTD., Hollinwood, Lancs, informs us that their standard 4-in. and 6-in. dial flame-proof moving-coil and moving-iron voltmeter and ammeters, which have previously held certificates for Groups 1 and 2 (five damp and petroleum vapour) have been approved for Group 3 (town gas and coke-oven gas). The Mines Department is reporting on these instruments. Dimensions and prices remain unaltered.

OVERSEAS ELECTRICAL TRADE

Analysis of Exports and Imports in August

AN interesting point which emerges from an examination of the Board of Trade returns for last month is how closely the value of electrical exports has followed the 1937 level. Thus in July, 1937, the total value was £1,545,547 and in July this year, £1,581,973; while in August, 1937, exports aggregated £1,400,638, compared with £1,470,590 last month. Even the amounts of many individual classes of equipment follow closely those of two years ago.

It appears, therefore, that the large decrease in the value of electrical exports last month compared with a year ago, which is shown in Table I, was not so much a serious contraction as a reversion to the pre-peak level of 1937. While exports of all types of articles wholly or mainly manufactured in this country showed an improvement over last year, they fell some 13 per cent short of the total value in August, 1937, whereas electrical exports were still slightly in excess of that time and from this point of view may be regarded as satisfactory.

TABLE I.—EXPORTS AND IMPORTS DURING AUGUST.

	EXPORTS Aug., 1939	Inc. or dec. compared with Aug., 1938	IMPORTS Aug., 1939	Inc. or dec. compared with Aug., 1938
Submarine telegraph and telephone cables	£395	− £14,549	*	—
Telegraph and telephone wires and cables (not submarine)	52,080	− 16,914	*	—
Other insulated wires and cables	283,109	+ 58,421	£21,781	− £644
Radio receivers, not radiograms (excluding valves)	24,477	− 4,504	14,182	+ 2,798
Radio transmitters (excluding valves)	22,512	+ 4,443	*	—
Radio valves	24,244	− 9,095	18,898	+ 8,437
Other radio parts and accessories	35,378	− 12,701	64,250	− 1,090
Telegraph and telephone apparatus (other than radio)	152,403	− 113,358	*	—
Electric carbons	*	—	7,937	+ 3,603
Incandescent lamps	44,851	− 5,439	8,017	− 943
Other lighting apparatus	53,811	+ 14,394	36,217	− 4,711
Primary batteries	15,524	+ 2,224	*	—
Accumulators‡	21,388	− 25,669	*	—
Electric cooking and heating apparatus	24,633	− 2,265	*	—
House service meters	21,911	+ 5,169	*	—
Other electrical instruments (not telegraph or telephone)	25,527	− 2,675	26,809	− 1,828
Insulating materials not elsewhere specified	19,330	− 906	*	—
Unclassified electrical goods and apparatus	113,522	+ 8,810	58,636	− 3,872
Electric generators up to 200 kW	36,799	− 530	*	—
Electric generators over 200 kW	107,928	+ 14,915	*	—
Electric motors	103,725	− 60,350	21,850†	− 1,980
Converting machinery	4,541	− 40,764	*	—
Transformers for lighting, heating and power, including coils	71,709		*	—
Rectifiers for power-house use	3,217	+ 2,585	*	—
Starting and controlling gear for motors	36,356	− 22,740	*	—
Switchgear and switchboards (not telegraph or telephone)	139,521	− 8,797	*	—
Other electrical machinery	10,535	− 3,583	24,143	+11,467
Electric vacuum cleaners	21,164	− 5,721	14,810	− 7,188
Total	£1,470,590	−£239,599	£317,530	+£4,049

* Not classified separately. † Not railway and tramway motors.
‡ Values not completely comparable.

In the goods and apparatus section insulated wires and cables (other than telegraphic and telephonic) were one of the few kinds of equipment exports of which fell away last year, but the decrease has now been fully recovered. The following is an analysis of shipments last month, with comparative values for August, 1938, in parentheses:—

Rubber insulated wires and cables.—Australia, £46,306 (£25,562); British India, £21,101 (£16,978); South Africa, £18,167 (£18,528); New Zealand, £7,206 (£6,013); other British countries, £20,374 (£15,559); and foreign countries, £7,134 (£11,899). Total, £120,288 (£94,539).

Electric wires and cables, insulation other than rubber.—South Africa, £50,366 (£26,378); Australia, £31,498 (£30,120); British India, £23,658 (£25,099); other British countries, £41,309 (30,827); and foreign countries, £15,990 (£17,725). Total, £162,821 (£130,149).

This improvement was, however, more than offset by a sharp contraction in exports of telegraph and telephone apparatus, other than radio, the chief destinations of which were: Australia, £40,268 (£65,036); South Africa, £30,232 (£21,678); other British countries, £30,848 (£75,679); Argentina, £10,451 (17,506); and other foreign countries, £40,604 (£85,862).

There was greater activity in the radio export trade in the first half of this year, but since then shipments have tended to diminish. Fewer receivers were sent abroad last month (4,546 against 5,390); the total up to date this year is, however, still in advance of the corresponding period of last year. The same applies to incandescent lamps, exports of which were slightly less in number last month but remained some 1,700,000 more than up to the end of August last year. House service meters have shown a fairly consistent rise in export value. Up to the end of last month the total was £166,279, compared with £130,919 in the corresponding period of 1938 and 126,082 in 1937.

A substantial shipment of generating plant to Australia resulted in the value of exports of this class being higher than a year ago, but other types of machinery were in smaller demand, with an aggregate reduction of £133,549.

Among the markets for British electrical equipment the Soviet Union and Rumania deteriorated most; in the case of the latter country the fall was particularly drastic. South Africa, British Malaya and Egypt were the markets showing the largest increases.

Electrical imports in August, at £317,530, were up by £4,049 on last year, but fell short of the August, 1937, total by £115,005. The United States remained the chief supplier, increasing its lead over Germany, as the following analysis reveals (August, 1938, values in parentheses): United States, £92,704 (£81,400); Germany, £52,100 (£59,624); Netherlands, £43,599 (£37,532); Belgium, £13,825 (£14,590); Switzerland, £13,512 (£11,270); France, £8,563 (£6,866); other foreign countries, £19,590 (£28,466); and British countries, £12,834 (£15,229). Total, £256,727 (£254,977).

TABLE II.—BRITISH ELECTRICAL EXPORTS DURING AUGUST.

Destination	Goods and apparatus, Aug., 1939	Inc. or dec. compared with Aug., 1938	Electric generators, Aug., 1939	Inc. or dec. compared with Aug., 1938	Electric motors, Aug., 1939	Inc. or dec. compared with Aug., 1938	Other electrical machinery, Aug., 1939	Inc. or dec. compared with Aug., 1938
Eire	£32,599	− £4,846	*	—	*	—	*	—
Channel Islands	10,815	− 1,049	*	—	*	—	*	—
Palestine	13,503	+ 3,694	*	—	*	—	*	—
British West Africa	10,230	− 2,333	*	—	*	—	*	—
Union of South Africa	165,933	+ 37,257	£25,348	− £212	£24,022	− £206	£88,357	−£24,409
British India	113,287	+ 3,093	17,992	+ 4,629	10,273	− 7,917	37,990	− 21,713
British Malaya	45,321	+ 24,013	*	—	*	—	4,175	− 4,964
Ceylon	8,531	− 13,546	*	—	*	—	*	—
Hong Kong	11,251	− 6,208	*	—	*	—	*	—
Australia	164,137	− 10,932	53,292	+ 47,241	7,888	− 30,252	11,937	− 7,040
New Zealand	63,283	− 16,302	*	—	3,934	− 2,283	19,556	+ 6,648
Canada	6,059	− 5,380	1,363	− 139	3,273	+ 994	4,877	+ 1,799
Other British Countries	61,752	+ 43	19,666	− 34,356	24,190	− 3,380	38,776	− 7,712
Soviet Union	10,987	− 36,398	*	—	*	—	*	—
Sweden	6,238	− 4,901	*	—	*	—	*	—
Denmark	8,162	− 9,503	*	—	*	—	*	—
Netherlands	14,546	+ 4,535	*	—	*	—	2,576	− 1,946
Belgium	8,397	− 1,505	*	—	*	—	*	—
France	10,205	− 3,583	*	—	*	—	2,350	− 170
Portugal	9,768	+ 5,740	*	—	*	—	*	—
Spain	1,454	+ 1,250	*	—	*	—	*	—
Italy	1,035	− 6,767	*	—	*	—	*	—
Greece	4,049	+ 540	*	—	*	—	*	—
Rumania	914	− 31,939	*	—	*	—	*	—
Egypt	26,690	+ 12,940	*	—	*	—	464	− 1,039
China	5,075	+ 1,124	*	—	*	—	1,399	− 1,471
Brazil	4,512	− 12,843	*	—	*	—	*	—
Argentina	30,744	+ 604	*	—	*	—	23,786	+ 8,729
Other Foreign Countries	85,618	− 41,412	27,066	− 2,778	30,145	−17,306	29,636	− 20,011
Total	£935,095	−£114,614	£144,727	+£14,385	£103,725	−£60,350	£265,879	−£73,299

* Not classified separately. Vacuum cleaners are included in Table I but not in Table II.

COMMERCIAL and INDUSTRIAL NEWS

Prohibited Imports and Exports. Australian Customs Duties. F.B.I. and Price Increases. Lighting Fitting Prices. Credits for Exports to New Zealand.

Trading with the Enemy

THE Board of Trade has made the Trading with the Enemy (Custodian) Order, 1939, under Section 7 of the Trading with the Enemy Act. It provides that all money which, but for the existence of a state of war, would be payable to, or for the benefit of, a person who is an enemy should be paid to the Custodian. The Order includes dividends, interest, matured securities, profits, debts, insurance payments, rents, payment in respect of requisitioned property and payments under trusts, wills and settlements. The money is to be paid to the Custodian within fourteen days of the coming into force of the Order (September 18th) if it is already payable or within a similar period of the day on which a payee becomes an enemy or in future cases within fourteen days of the money becoming payable. An exception is made in the cases of transactions authorised by a Secretary of State, the Treasury or the Board of Trade.

The Board of Trade may order enemy property to be vested in the Custodian who shall have certain powers including the right to transfer such property. The Custodian may be granted a patent applied for by or on behalf of an enemy or enemy subject and such a patent shall be deemed to be property vested in the Custodian.

It is directed that any person who holds or manages property on behalf of an enemy shall within fourteen days from September 18th furnish the Custodian with any particulars of the property which he may require.

Every company incorporated in the United Kingdom, or with a share transfer or registration office in the United Kingdom is required, within fourteen days from September 18th, to send to the Custodian full particulars of holdings by or on behalf of enemy subjects. The same applies to firms in which there are enemy partners or interests. Where the Custodian exercises the power to sell shares and stock vested in him the company concerned may, with the consent of the Board of Trade, purchase such securities.

The Order also lays down the scale of fees to be charged by the Custodian and enables him to transfer property to the Custodian of another part of the United Kingdom.

Australian Tariff Amendments

The *Board of Trade Journal* reports that the High Commissioner for Australia has received telegraphic advice of amendments to the Commonwealth Customs tariff operating on and from September 15th. Among the amended items are the following:—Electrically driven lawn mowers: British preferential tariff, 22½ per cent. *ad valorem*; general tariff, 40 per cent. *ad valorem*. Unassembled parts of refrigerators: British preferential tariff, 32½ per cent. *ad valorem*; general tariff, 75 per cent. Dynamo-electric machines (n.e.i.): British preferential tariff, 30 per cent. *ad valorem*; intermediate tariff, 50 per cent.; general tariff, 65 per cent. Electric fans of the type ordinarily used in offices and the household: British preferential tariff, 12½ per cent. *ad valorem;* general tariff, 65 per cent. Electrolytic condensers: British preferential tariff, 30 per cent. *ad valorem*; general tariff, 65 per cent. *ad valorem*, or 7d. each for over 100 V and 3d. each for other condensers, whichever is the higher.

Prohibited Imports and Exports

The Board of Trade has issued the Import of Goods (Prohibition) (No. 1) Order, which forbids the importation of a number of classes of goods except under licence from the Board. It does not apply to goods which had been dispatched to this country before the date of coming into force of the Order (September 5th), nor to goods imported from the Channel Islands. The following electrical and allied goods are included in the first schedule to the Order:—

Hand lamps, pocket lamps, hand torches and inspection lamps and parts (other than batteries and flash-lamp bulbs of 4.5 V or less). Electric-lamp bulbs and parts thereof other than flash-lamp bulbs of 4.5 V or less. Fittings and accessories of the kind used in interior electric lighting systems of the following descriptions: Brackets, pendants, candelabra and electroliers and fittings therefor; ceiling roses; fuse-holders and bases; fuse and distribution boards and boxes; lampholders; lanterns; shades, bowls and reflectors and fittings and holders therefor; sockets, plugs, adaptors and connectors; switches; table and floor standards; and parts of any of these articles.

The Order also covers illuminating glassware not elsewhere referred to; vacuum cleaners; cleaners and washers; driers, wringers; ironing machines; and combinations of these machines.

Under the Export of Goods (Prohibition) (No. 2) Order the export of many classes of raw materials and manufactured goods is forbidden or restricted. The following goods may not be exported from the United Kingdom or shipped as ship's stores: Wireless valves (except receiving valves) and other electric discharge tubes and parts thereof; lighting carbons and furnace carbon electrodes; permanent magnets; X-ray tubes, valves and parts; generators, transformers and switchgear; magnetos; and refrigerating machinery. The Board of Trade, is, however, empowered to grant licences for the export of such goods.

F.B.I. and Price Increases

At the request of the Government the Federation of British Industries has told its members that it is of the utmost importance that prices of articles of common use should be kept as stable as possible. Any increases of prices not directly related to increases of costs should be avoided in the public interest. In a letter to members Mr. Bennett, the president, says that apart from that overriding consideration it is against the interests of industry itself that such increases should take place, since industry is not only a producer, but also an immense consumer of industrial products and raw materials in one form or another.

Employment in August

Employment in the engineering industry between July 10th and August 14th in most of the principal sections of the engineering industry showed a further slight improvement and was very good on the whole, particularly so in electrical engineering.

According to the *Ministry of Labour Gazette*, the total unemployed in the engineering industry was 55,031, a decrease of 1,545, or 0.1 per cent., as compared with July, and a fall of 3.2 per cent. as compared with August, 1938. In electrical engineering the number out of work fell from 3,556 to 3,411, the percentage being 2.9 (against 3 per cent. in July and 5.3 per cent. in August, 1938).

The unemployed in the electrical wiring and contracting industry totalled 3,569 (8.4 per cent.), a decrease of 1.3 per cent. as compared with the month before, and a fall of 2.4 per cent. as compared with August, 1938. In the electric cable, apparatus, lamps, &c., group the proportion of unemployed fell by 0.6 to 4 per cent. (7,148), (7.1 per cent. in August, 1938).

Industrial Lighting Fittings

Members of the Industrial and Commercial Section of the Electric Light Fittings Association have considered the increase in production costs directly affecting types of fittings covered by the Section's activities (see Schedule 3 of the Fair Trading Policy). To assist in regulating the industry in the national interests, it has been agreed that increases in published prices ruling on September 3rd on the scheduled categories of fittings shall be limited to 10 per cent. until further notice. The agreed increase may apply as and from September 25th, and the object of indicating an agreed maximum increase is to avoid, so far as the Section's influence extends, any increases that are not warranted.

Radio Industry in Wartime

The Radio Manufacturers' Association is giving careful consideration to the problems with which the radio industry is faced as a result of the present emergency. Realising the importance of radio in the national life it is desired to state that it is the intention of the industry to carry on to the best of its ability with the service which it is rendering to the community.

Difficulties of an unusual kind have to be met, and it is inevitable that costs of production will tend to increase. It is unavoidable that this increase in cost must be reflected as time goes on in some rise in the prices of radio sets and components, but it is the policy of the industry that such price increases as do occur shall be limited to meeting the extra charges which may be placed upon the industry.

Exports to New Zealand

An agreement has now been completed between the New Zealand Government and the Exports Credits Guarantee Department under which the Department will make guarantees available to United Kingdom exporters in connection with the commercial export to New Zealand of goods wholly or partly produced or manufactured in the United Kingdom. The Department's liability will be limited to 75 per cent. of each debt and its total liability will at no time exceed £4,000,000 sterling, of which not more than £1,000,000 will be in respect of shipments falling due for payment subsequent to June 30th, 1940.

Provision is made under which the Department may extend the facilities to cover shipments made after June 30th next under such conditions as circumstances then warrant. The agreement applies to payments due in respect of goods shipped from the United Kingdom to New Zealand between August 1st, 1939, and June 30th, 1940, in respect of which the purchasers make irrevocable deposits in New Zealand of local currency to a value equivalent to the full amount of the debt.

In conjunction with the scheme the New Zealand Government has arranged for the granting in New Zealand of

remittance authorities by the Reserve Bank of New Zealand to each licensed importer, indicating the particular month or months up to June, 1940, in which sterling funds to cover his imports will be made available to him. Further, by arrangement with the Reserve Bank, the New Zealand trading banks have been authorised to enter into forward sterling exchange arrangements with licensed importers. These arrangements will protect the United Kingdom exporter and the New Zealand importer against loss on transactions resulting from an adverse movement in the rate of exchange.

The effect of the arrangements made in New Zealand is that from the time an importer has deposited the amount due for purchase of goods exported from the United Kingdom, the New Zealand Government, through the Reserve Bank, guarantees that payment of sterling at the then current rate of exchange will be made to the United Kingdom exporter. Exporters to New Zealand can rely on the successful working of the deferred remittance procedure of the Reserve Bank. If, however, they require additional safeguards and particularly if they need immediate finance, they can avail themselves of the guarantees offered by the Export Credits Guarantee Department which should enable them to obtain the necessary accommodation through the ordinary banking channels.

Full particulars of the conditions under which the guarantees will be made available can be obtained from the Export Credits Guarantee Department, 9, Clements Lane, London, E.C.4, or any of its branches.

Callender's Arrangements

Callender's Cable & Construction Co., Ltd., is making only those changes in its organisation which are necessary to meet the emergency conditions. The cable, cable accessories and engineering equipment factories are being kept in full production to a degree only limited by the recent official regulations. The head offices remain at Hamilton House, Victoria Embankment, London, E.C.4, where ample air-raid shelter facilities have been provided for the management and staff. Personnel in most departments there has been reduced by the calls of national service, but not sufficiently to disturb normal working and attention to customers' requirements. Catalogues and other publications are being issued in the usual manner, and every endeavour is being made to continue the whole of the company's services.

American Exports of Domestic Appliances

During the six months to the end of June last there was a decline in the overseas demand for American domestic electrical appliances. The following table shows that the exports of such goods during the period mentioned attained a value (at 5 dollars to the £) of £1,635,304, a decrease of £132,548 as compared with the corresponding half of 1938.

	Jan.–June			
	1938		1939	
	No.	Value £	No.	Value £
Household refrigerators	75,899	1,120,901	68,779	1,041,743
Electric fans	79,042	79,010	66,187	66,570
Electric washing machines and parts	32,516	271,710	32,400	264,765
Electric vacuum cleaners	16,930	63,382	11,615	44,904
Electric vacuum cleaners and parts...	—	37,639	—	27,545
Electric irons	96,056	33,902	74,998	25,891
Electric cooking ranges	2,974	32,624	2,700	30,661
Electric heaters and ovens	8,719	12,850	10,393	16,431
Other domestic electrical utensils ...	91,263	48,320	84,304	44,715
Other domestic electrical devices ...	33,665	67,514	28,822	72,079
Total		£1,767,852		£1,635,304

Radio Interference Suppression in Victoria

The Department of Overseas Trade has received from H.M. Trade Commissioner at Melbourne a copy of a memorandum issued by the State Electricity Commission of Victoria, which gives rulings relating to the installation of radio interference suppressors. The memorandum may be seen by those interested at 35, Old Queen Street, London, S.W.1. Reference 26458/39 should be quoted.

E.A.W. Hints on Rationing

The "Hints and Suggestions" on the rationing of electricity prepared by the Electrical Association for Women has now been issued as a convenient eight-page pamphlet. It is priced at one penny (1½d. by post), but special prices are quoted for quantities.

Institute of Fuel

At a meeting of the Council of the Institute of Fuel held last week it was decided to cancel the annual dinner and dance arranged for October 19th. As a partial substitute for the dinner, and in honour of Mr. H. A. Humphrey, the Melchett medallist, the Council decided to arrange a luncheon to be held at the Connaught Rooms at 12.45 for 1.15 p.m. on the same date, when copies of the Melchett Lecture will be given to all present and Mr. Humphrey will give a summary of his address, together with some additional information, and the Melchett Medal will be presented to him.

The ordinary meetings of the Institute for the presentation and discussion of papers are to be suspended for the time being. Meanwhile, the Council has decided to continue publication of the *Journal* and publish in it the papers which would have been presented at the ordinary meetings and invite discussion on them by correspondence. Technical information from other sources likely to be of interest and assistance to members will also be included. It is intended to arrange luncheons in London periodically so that members can keep in touch with one another. It has been decided to remove the head office to 30, Bramham Gardens, London, S.W.5 (tel. : Frobisher 3649).

In accordance with the resolution passed at the extraordinary general meeting on July 19th, a petition was presented to His Majesty's Privy Council on August 24th for the grant of a Royal Charter to the Institute.

G.E.C. and National Service

The General Electric Co., Ltd., has 2,135 of its employees serving with the Forces. One-third of the total male staff in the sales organisation is with the Colours. The company gives a generous allowance to all employees with the Forces.

Britain to Buy Surplus Australian Metals

A *Reuter* message from Canberra states that Mr. Menzies, the Commonwealth Prime Minister, announced on September 21st that arrangements had been completed for Great Britain to purchase the whole of the surplus stocks of Australian refined zinc and copper and most lead stocks. The prices would be approximately those ruling before the outbreak of hostilities.

Temporary Removals

The address of the Incorporated Municipal Electrical Association is Electricity Department, P.O. Box 86, Charles Street, Leicester.

Bruce Peebles & Co., Ltd., inform us that their London office has been removed to 93, High Street, Epsom, Surrey.

The temporary address of *The Draughtsman* is 1, Links Road, Epsom.

Sharples Centrifuges, Ltd., has transferred its offices to "Hill Grove," Rooksmoor, Woodchester, nr. Stroud, Glos. (telephone : Amberley 79).

The Yorkshire Switchgear & Engineering Co., Ltd., has removed its London office to 94, Beachlands, Pevensey Bay, Sussex (telephone : Pevensey Bay 354).

The sales department of Edison Swan Cables, Ltd., has been transferred to the company's works at Lydbrook, Glos.

The head office of the Power Lines Construction Co., Ltd., has been removed to 103, Sedlescome Road North, St. Leonards-on-Sea, Sussex (telephone : Hastings 4346).

The London office of Gent & Co., Ltd., is now at 6, Draycott Avenue, Harrow, Middlesex.

Telephone & Associated Services, Ltd., have removed to "Brocket," Boyn Hill Avenue, Maidenhead.

The offices of the Institute of Wireless Technology have been transferred to 25, Firs Drive, Palmers Green, London, N.13. For the duration of the war examinations will be held only once a year.

A.R.P. Booklet

British Timken, Ltd., has issued an A.R.P. booklet to all of its employees in which it gives types of the more important poisonous gases, their effects and first-aid treatment; useful notes on decontamination, and the cleaning and disinfection of respirators are also included. The booklet has also been circularised to a large number of engineering concerns.

B.I.F. Cancelled

The British Industries Fair, which was to have been held in London and Birmingham in February, 1940, has been cancelled. The Department of Overseas Trade will communicate with individual exhibitors in London and the Birmingham Chamber of Commerce with Birmingham exhibitors.

Home-made Hair Curler Fatality

When an inquest was held recently at Richmond (Surrey) into the death from electric shock of Anthony Smyth, a sixteen-year-old naval cadet, it was stated that he was found holding a home-made electric hair curler with which he had apparently been trying to curl his hair. The boy's father said that his son had always been interested in electrical and engineering work. A verdict of "Death by Misadventure" was recorded.

Linolite Products

Linolite, Ltd., informs us that in view of the fact that it holds large stocks of its products it does not propose to advance its prices now or in the near future.

Change of Name

We are informed that C.A.V.-Bosch, Ltd., has changed its name to C.A.V., Ltd.

French Rural Electrification

The September number of *B.I.P.* (*Bulletin d'Informations Pratiques*) the monthly organ of E.D.A.'s equivalent in Paris, is wholly devoted to rural electrification. It contains several illustrated articles on various phases of the subject. An introductory article by Monsieur L. Patrix, chief engineer of the Génie Rurale and professor of applied electrotechnics at the Ecole Supérieure du Génie Rurale, states that in 1919 only about 20 per cent. of the 38,000 French communes were in receipt of an electricity supply; at January 1st, 1938, only 1,486 were without a supply. From an inquiry conducted

(Continued on Page 431)

among electrified farms it appears that the great majority of motors in use range from 1 to 5 HP. Particular interest attaches to the methods of mounting portable motors on trolleys, barrows and various forms of tripod.

Changes of Address

W. Andrew Bryce & Co., Ltd., have moved to Shenley Road, Boreham Wood, Herts, to the same factory as its associated company, Furzehill Laboratories, Ltd.

The South Wales Electric Power Co. has now completed the removal of its central offices to St. Mellons, Cardiff (telephone : St. Mellons 300).

Conference Cancelled

The sixth annual conference of the Institute of Vitreous Enamellers has been indefinitely postponed.

The Radiovisor Light-ray

"A Modern Marvel (The Harnessing of Light)," by Col. The Hon. Arthur Murray (Electrical Press, Ltd., price 1s. 6d.), which was first published last year, has now been reprinted with additions. This interesting booklet describes the various kinds of Radiovisor light-ray apparatus in operation and shows the value of light-ray methods in various processes. The author points out that although it is being applied to many uses at the present time, only the threshold of the subject has been passed, and an ever-widening and more interesting field of light-ray experimentation and achievement lies ahead.

Factory Lighting in Wartime

It is evident that so far as industrial establishments are concerned even more light will be needed in the present circumstances than in normal times. The screening of all windows and roof lights is compulsory and, as Mr. E. A. Marx, of Benjamin Electric, Ltd., points out, the possibility of the breakage of the glass makes it desirable to cover windows with some stout material which will not easily be removable in daytime. Consequently many premises will need artificial lighting by day as well as night and this means that even greater importance attaches to properly planned and adequate installations.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances :—

CHEMICALS, ETC.	Price Sept. 27th	Fortnight's inc. or dec.
a Acid oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£37	—
a Ammonia, Muriate (large crystal) ... ,,	£18 10s.	—
a Borax ... ... ,,	£17	—
a Copper, Sulphate ... ... ,,	£19	—
a Potash Chlorate ... ... per lb.	3⅞d. to 4¼d.	—
a ,, Perchlorate ... ... ,,	6d.	—
a Shellac ... ... per cwt.	£4 8s.	—
a Sulphur, Commercial ... ... per ton	£11	—
a ,, Roll ... ... ,,	£11	—
a Soda, Chlorate ... ... per lb.	3¼d. to 3⅞d.	—
a ,, Crystals ... ... per ton	£5 to £5 5s.	—
a Sodium, Bichromate, casks ... per lb.	4¼d. net	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£94	—
b ,, Wire ... ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil ... ... ,,	1/2½ to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£197	—
Grade II ... ... ,,	£137	—
Grade III ... ... ,,	£73	—
c Brass (rolled metal 2" to 12" basis)... per lb.	9d.	½d. inc.
c ,, Tubes (solid drawn) ... ... ,,	1/0½ to 1/0½	—
c ,, Wire, basis ... ... ,,	9½d.	½d. inc.
c Copper Tubes (solid drawn) ... ,,	1/1½d.	—
g ,, Bars (best selected) ... ... per ton	£87	£1 inc.
g ,, Sheet ... ... ,,		
g ,, Rod ... ... ,,		
d ,, (Electrolytic) Bars ... ... ,,	£52	—
d ,, ,, Wire Rods ... ,,	£56 10s.	—
d ,, ,, H.C. Wire ... per lb.	8⅝d.	—
f Ebonite Rod ½" dia. & up ... ... ,,	1/10 to 2/3	—
f ,, Sheet ⅛" thick & up ... ,,	1/4 to 1/8	—
n German Silver Wire, Nos. 1 to 12 ... ,,	2/5	1d. inc.
h Gutta-percha, fine ... ... ,,	Nom.	—
h India-rubber, Para-fine ... ... ,,	11d.	1½ inc.
g Lead, English Pig ... ... ,,	£18 10s.	—
g Mercury ... ... per bot.	Nom.	—
e Mica (in original cases) small ... per lb.	1/3 to 3/–	3d. to 6d.inc.
e ,, ,, ,, medium ... ,,	9/– to 18/–	1/6 to 3/–inc.
e ,, ,, ,, large ... ,,	20/– to 27/6	2/6 to 5/–inc
p Phosphor Bronze, plain castings ... ,,	1/2½	—
p ,, ,, drawn bars & rods ,,	1/1½	—
p ,, ,, rolled strip & sheet ,,	1/0½	—
p ,, ,, wire ... ... ,,	1/2½	—
o Platinum ... ... per oz.	£10	—
d Silicium Bronze Wire ... ... per lb.	8½d.	—
g Spelter ... ... per ton	£15	—
g Tin, Block (English) ... ... ,,	£230	—
n ,, Wire, Nos. 1 to 16 ... ... per lb.	3/9	—

Quotations supplied by :—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in this section under the same heading.

Junior Institution of Engineers

The Junior Institution of Engineers will carry on from its official address, 39, Victoria Street, Westminster, S.W.1, where the library and reading rooms are open for use of members from 9.30 p.m. to 5.30 p.m. The Council has decided to hold one meeting per month and the social evening arranged for October 6th will be held, but the time limited from 5.30 p.m. to 7 p.m. Air-raid shelter accommodation is available in the building.

Price Reduction

The pearl "Osram" photo-flood photographic lamp of the G.E.C. has been reduced in price. Reductions have also been made in the prices of two projector lamps. These are both Class A.1 with biplane filament and prefocus cap.

French Testing Laboratory

The equipment of the high-voltage testing laboratory of the Ateliers de Constructions Electriques de Delle at Villeurbanne, Lyons, France, has recently been extended by the addition of a 1,500,000-V 50-cycle transformer and an increase in the capacity of the power surge generating station to 2,500,000 V.

Bakelite for A.R.P. Purposes

As some doubt has been cast upon the suitability of Bakelite for use in the construction of A.R.P. fittings, Bakelite, Ltd., thinks it desirable to make it known that the use of plastics of the phenol-formaldehide or urea-formaldehide types, *e.g.*, Bakelite, Beetle and Scarab, have received official approval for this purpose.

Consulting Firms Amalgamated

The firm of Henry Lea & Son, consulting engineers of Birmingham, and the firm of Edwin S. Hoare & Partners, consulting engineers of Bristol, Birmingham and London, have now been amalgamated, the partners being Messrs. Edwin S. Hoare, B.Sc., A.M.I.C.E., A.M.I.E.E., M.I.H. and V.E., Donald M. Lea, B.A. (Eng.), and R. E. Stokes, A.M.I.H. and V.E. The head office will be at 158a, Edmund Street, Birmingham, 3, with offices at 39, Board Street, Bristol, and Sardinia House, Sardinia Street, London, W.C.2. The firm will in future be known as Hoare, Lea & Partners.

New Catalogues and Lists

Berry's Electric, Ltd., Touchbutton House, Newman Street, London, W.1.—The new catalogue of "Viking" and "Masta" switchgear shows in one line at one opening the specification of the unit, the price for standard paint finish, the extra charge for high-rupturing-capacity fuses, weatherproof of galvanised cases, and full dimensions. Prices have been reduced in a number of cases.

W. H. Sugden & Co., Ltd., Glenny Road, Barking.—A list of new and reconditioned motors for sale.

Rotherham & Sons, Ltd., Coventry.—An illustrated folder relating to time lags for the automatic control of switchgear, circuit-breakers, derricks, hoists, lifts, automatic stokers, &c.

Ransomes & Rapier, Ltd., Waterside Works, Ipswich.—Leaflets on self-priming pumps, concrete mixers and road makers.

W. Andrew Bryce & Co., Ltd., Shenley Road, Boreham Wood, Herts.—Leaflets describing new rectifier sets, double-wound step-down transformer units, battery chargers and bakelite connector blocks.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Pamphlet No. 1099A/9.39 giving a summary of all the company's types of relays.

Electric Art Shades (1928), Ltd., Feering Factory, Kelvedon, Essex.—A leaflet illustrating A.R.P. shades made of a green and white card.

Revo Electric Co., Ltd., Tipton, Staffs.—A leaflet dealing with "IES/ARP.02" fittings, the second of a series of units designed in accordance with specification BS/ARP/20.

Sangamo Weston, Ltd., Great Cambridge Road, Enfield.—Folders M7 8/39 and M7a 8/39 describing a new range of instrument transformers.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Catalogue OS.(2) containing sixty pages dealing with photographic lamps and equipment for studio lighting.

Crypton Equipment, Ltd., North Acton Road, Park Royal, London, N.W.10.—A catalogue describing a range of A.R.P. shelter lighting equipment designed to conform with the recent specification prepared by the B.S.I.

Information Department

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following :—

MAXIVEE tumbler switch.
UNION bench drilling machine.
SAVAS lampholder.

ELECTRICITY SUPPLY

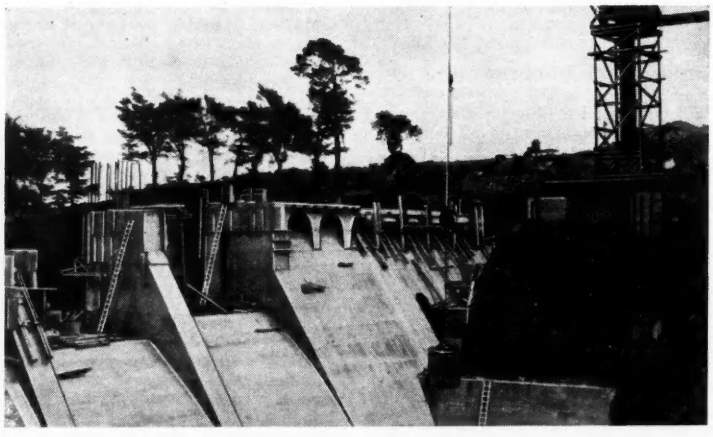
Use of Street Lamps at Bolton. Brighton Plea for Modified Street Lighting. Restriction of Hire Schemes. Croydon Inquiry.

Blackburn.—SUPPLY TO MILL.—The Electricity Committee has acceded to the request of British Celanese, Ltd., for a supply to the company's mill at Great Harwood. The cost of the extension will be £1,164.

Bolton.—STREET LAMPS AS DIRECTION INDICATORS.—It is reported in *The Times* that 200 street lamps are to be brought into use again at night as direction indicators. They will be used with darkened glass sides to point the way to air-raid shelters and first-aid posts.

Bradford.—ASSISTED WIRING AND HIRE SCHEMES RESTRICTED.—It has been decided to discontinue all work in connection with assisted wiring, hire and hire-purchase which involves further loans.

MORE ELECTRICITY SOLD DESPITE "BLACK-OUT."—A gratifying sales report was made to the Electricity Committee last week, when it was shown that the quantity of electricity sold had increased by 4,654,000 kWh in the period from April 1st to September 9th, as compared with the corresponding period last year. There was still an increase in sales during the fortnight which included the first week of the war in spite of the lighting "black-out" and curtailment of transport services.



Good progress is being made with the Liffey hydro-electric scheme at Poulaphouca, Eire. The photograph shows the main dam now approaching completion

Brierfield.—TARIFF CHANGES.—Owing to the fact that during the last three years the expenses of the undertaking have risen by £1,000 a year the Urban District Council has decided to increase the scale of charges for electricity as from the reading of meters for the quarter ending September 30th. For the time being the hire purchase of new appliances is to be discontinued. The assisted wiring scheme will be retained on existing terms.

Brighton.—APPEAL FOR MODIFIED STREET LIGHTING.—The A.R.P. Committee recommends that, in view of the danger to the public owing to the severity of the present lighting restrictions, the Government should be urged to permit some form of shaded lighting in the main roads, subject to its being possible to make arrangements for the immediate extinction of the lamps when air-raid warnings are received.

FIRE DUE TO LIGHTNING.—Reporting on the fire at Southwick power station on July 17th the electrical engineer mentions that during a severe thunderstorm a direct stroke of lightning appears to have struck one of the outdoor reactors through which a supply is afforded to a section of the 8,000-V works power switchboard. The consequential effects were that the bus-bars of this works power switchboard short-circuited and the switchgear was partially destroyed by fire. A portion of the roof above was also involved. The interruption of supply was of approximately 80 minutes' duration. The manner in which the shift handled the situation and the ready response of other staff was a matter for commendation.

Bury.—LOAD TRENDS IN 1938-39.—But for the improvement in the domestic demand the Electricity Department's sales last year would have shown a serious falling off. Power supplies contracted by over 3 million kWh, half of which was made up by increased domestic consumption. Excluding bulk supplies, the undertaking sold 31.2 million kWh, a reduction of 5 per cent. compared with the previous year. In the prevailing conditions this result is regarded as not unsatisfactory by the borough electrical engineer and manager, Mr. J. G. Potts, who remarks that at the date of the report the general position of industries in the borough seemed to be improving. The average price of electricity supplies remained low—0.856d.—although slightly more than in the previous year. Although revenue was lower—£143,490 against £144,581—and working expenses increased from £113,243 to £116,163 the net profit improved from £15,822 to £16,860, principally as the result of lower interest charges. The number of consumers at the end of the year was 14,999, an increase of 945 during the period.

Cardiff.—CONTRACT FOR POWER STATION EXTENSION.—The Electricity Committee recently recommended for acceptance a tender of £232,529 for building work in connection with the extension of Roath power station under the Central Electricity Board's direction.

Clitheroe.—AVOIDING PEAK DEMANDS.—The gas and electrical Engineers are preparing schemes whereby consumption may be spread so as to secure greater uniformity in consumption and avoid peak demands.

Colne.—HIRE-PURCHASE TO BE STOPPED.—The Council has decided to suspend the hire-purchase of electrical apparatus until further notice. Agreements now in force will be continued.

Croydon.—OBJECTIONS TO PROPOSED NEW GENERATING STATION.—Sir Cyril Hurcomb, chairman of the Electricity Commission, sitting with Mr. Morley New, on September 14th, heard objections by Croydon ratepayers against the erection of a new power station on a site near Purley Way.

On behalf of the Croydon Corporation it was stated that the plant would consist of two 30,000-kW turbo-alternator sets, with boiler plant and cooling towers, the total cost being in the neighbourhood of £1,300,000. Mr. F. N. Rendell Baker, the borough electrical engineer, stated that the question of extending the existing station had been gone into and it had been decided that such a step was undesirable and uneconomical. The proposed site was part of the area allocated to factory development.

The objectors maintained that the proposed station would create a nuisance in the way of precipitated vapour from the cooling towers and dust from the chimneys. Mr. Rendell Baker replied that the nearest house would be over 1,000 ft. away from the station. Although the present station had room for another set it was thought unwise to install it there when a new station would be required in any event in about four years. The existing plant had a maximum output of 88,000 kW and the maximum demand was about 50,000 kW. The chairman mentioned that the new station would form part of the grid system. At the conclusion of the proceedings he said that before giving approval to the plans the Commissioners would want an assurance that the cooling towers would be placed as far as possible from houses.

EXTENSION OF SUPPLY AREA.—The Finance Committee reports that the draft deed of transfer of the Addington electricity undertaking to the Corporation has now been agreed with the County of London Electric Supply Co., Ltd., and that the amounts payable under the deed are £85,000 in respect of the undertaking as it existed at November 30th, 1932, £95,635 for capital expenditure on the undertaking, with the approval of the Corporation, from November 30th, 1932, to March 28th, 1939, plus 5 per cent. and £22,485 interest payable on the amounts. In addition, the Corporation has agreed to purchase stores acquired by the company for use in Addington, at a price to be agreed.

East Ham.—STREET LIGHTING CONVERSION.—The borough electrical engineer reports that he is in communication with the borough engineer of Woolwich with regard to the change over of street lighting in the North Woolwich area from gas to electricity.

East Murton (Co. Durham).—STREET LIGHTING AGREEMENT.—The Parish Council has approved a new street lighting agreement with the South Hetton Coal Co. to last three years.

Hungerford.—LIGHTING SCHEME DECISION.—At a recent meeting of the Parish Council a discussion arose in regard to the lighting scheme for the town by the Wessex Electricity Co. It was eventually decided that the Council should proceed with the scheme in certain roads.

Isle of Man.—INQUIRY INTO BULK SUPPLY CHARGE.—The Electricity Board has agreed to the proposal for an inquiry into the price charged by the Douglas Corporation for a bulk supply. The Board has raised the points (1) whether or not

the cost of electricity from the Pulrose station is too high, and (2) whether the Board could generate its own supply at a cost so much less than that paid to the Corporation to justify the Board putting down its own plant.

London.—PROPOSED PRICE INCREASE AT ISLINGTON.—The Islington Electricity Committee recommends that the flat-rate charge shall be increased from 2½d. to 3d. per kWh and the two-part tariff secondary charge from ¾d. to 1d. per kWh, with corresponding rises in other tariffs.

Northern Ireland.—LOAN FOR NEW STATION.—At a recent meeting of the Finance Committee of the City Council it was decided to apply for sanction to borrow £471,500 for the provision of new plant at the Harbour power station consisting of a 30,000-kW turbo-alternator with the necessary boiler plant. Mr. F. H. Whysall, city electrical engineer, stated that the new plant would be sufficient to meet the Council's requirements up to the year ending March, 1948. The Council has already approved the borrowing of £55,385 in respect of eight new sub-stations required for the trolley-bus service on the eastern side of the city.

Oldham.—BORROWING POLICY.—The electrical engineer (Mr. Ogden) told the Electricity Committee at its meeting last week that any loan granted would have to be re-applied for. There would have to be special application in connection with work that was considered of immediate importance. If such work had no war value it would be better not to apply. He had been in touch with neighbouring authorities concerning borrowing powers for the hire-purchase scheme, and the general consensus of opinion was that it would be inadvisable to carry on for the time being. The Committee thereupon decided to discontinue the hire-purchase system for the duration of the war except in exceptional circumstances, and to re-apply for the loan sanctioned in connection with Slacks Valley; loan sanctions granted for other work are to be cancelled.

TRACTION

London.—"UNDERGROUND" EXTENSIONS.—The London Passenger Transport Board is continuing work on the various sections of its £45,000,000 programme. The tube link between the Bakerloo Line at Baker Street and the Metropolitan Line at Finchley Road was intended to be opened early in October, and although this was found impracticable in present circumstances it is still hoped that it will be possible to bring this new line into service before the end of the year, states the *Railway Gazette*. Actually, it is understood that the engineers are working with the object of completing the line by the end of October, so that the projection of Bakerloo Line tube trains to Stanmore may take place as soon thereafter as possible.

United States.—AIR-CONDITIONED DINING CARS.—Delivery of fifteen new streamlined dining cars ordered earlier this year by the Pennsylvania Railroad has been completed by the three equipment builders with whom the orders were placed. Five of the new dining cars are fabricated of stainless steel by the shotweld process. Five others have aluminium alloy bodies, while the remaining five are of high-tensile steel. The aggregate cost was approximately $2,100,000. Electro-mechanical air-conditioning in all the cars ensures even, draughtless circulation of air at thermostatically controlled temperatures. Roofs, walls and floors are completely insulated against sound and heat conductivity with fireproof materials. The kitchens are isolated from the dining rooms by the use of "air curtains." The kitchens themselves are models of efficiency, with electric dish-washing machines, electric waste disposal and other labour-saving devices.

COMMUNICATIONS

Great Britain.—CHEAPER EMPIRE PRESS TELEGRAMS.—Sir Edward Wilshaw, chairman of Cable and Wireless, Ltd., announces that in view of the importance of speedy transmission of news throughout the Empire at the present time his company and its associated companies are, with the agreement of the Empire Governments, drastically reducing the rate for urgent press telegrams between all points within the Empire for the duration of the war. The new rates will be half those at present in force for this class of telegram. Urgent Press telegrams enjoy a precedence of transmission under the international regulations by which the company is bound.

Russia.—PROGRESS IN TELEPHOTOGRAPHY.—By the end of July 120,000 more phototelegrams had been sent and received in Moscow than the total number for the whole of 1938, it is reported. All kinds of materials are sent in this way, from the plans drawn up by various People's Commissariats to letters and cartoons. The introduction of telephotography has also facilitated the sending of telegrams in any language, whereas by the standard method they had to be sent in either Russian or Latin script.

To-day it is possible for Moscow to communicate by telephotography with seventeen large cities of the Soviet Union; twelve of them are linked with Moscow by wire and five by wireless, these latter being the distant towns of Tashkent, Irkutsk, Khabarovsk, Baku and Tbilisi. An experimental telephotographic system has now been opened from Moscow to Alma-Ata, by wireless, and from Moscow to Kuibyshev, by wire.

In addition, it is stated that the Scientific Research Institute for Communications has perfected a method of employing the photo-electric cell for the transmission of pictures in colour, excluding pale green, pale blue, and yellow. An inspector in the Exploitation Department of the Central Telegraph Office in Moscow has also invented apparatus which renders it possible to reproduce and transmit telephotographic materials to several destinations simultaneously, and this will be of particular value in the transmission of official telegrams and materials intended for more than one destination.

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FINANCIAL SECTION

New Companies. Returns of Capital. Debenture Charges. Bankruptcies and Liquidations. Reports of Electrical Companies. Dividend Announcements. Stocks and Shares

New Companies Registered

Exide Batteries, Ltd.—Private company. Registered September 13th. Nominal capital, £100. Objects: To carry on the business of makers of and dealers in electrical or chemical appliances and goods, &c. Directors: W. S. Naylor, 44, Park Road, Pendleton, Salford, E. C. Hopkinson, Chateaulin, Mead Road, Torquay, Sir John P. Hewett, Kt., The Court House, Chipping Warden, Banbury, Oxon, D. P. Dunne, 187, Victoria Street, London, S.W.1, H. W. Lee, Reinden Wood, Hawkinge, Kent, and J. R. Williams, R. C. Narberg and H. B. Gay, all of Allegheny Avenue and 19th Street, Philadelphia, Pa. Secretary: C. M. Mills. Registered office: Exide Works, Clifton Junction, near Manchester.

Selkirk Relay, Ltd.—Private company. Registered in Edinburgh, September 22nd. Capital, £1,000, £1 each. Objects: To establish and carry on a wireless relay system in Selkirk and surrounding district. Directors: B. Groom, The Hollies, Galashiels, and J. Smith, Old Gala House, Galashiels. Registered office: Hall Place, Galashiels.

Actinic Batteries, Ltd.—Private company. Registered September 20th. Capital, £5,000. Objects: To carry on the business of wireless, electrical, lighting and general engineers, consulting wireless experts, manufacturers of and dealers in batteries, dynamos, accumulators, &c. Subscribers: A. J. Durrant, Tintagel, New Road, Wonersh, Surrey, and J. E. Bourne, 17, Chestnut Road, Guildford. Secretary: S. Barber, 10, Florida Road, Shalford, Surrey.

Comprehensive Electrical Developments, Ltd.—Private company. Registered September 20th. Capital, £5,000. Objects: To carry on the business of manufacturers and suppliers of electrical plant, equipment and accessories; producers and suppliers of electrical energy, &c. Subscribers: J. F. Seacombe and R. J. Gay, both of 1, Threadneedle Street, E.C.2. Solicitors: Simmons & Simmons, 1, Threadneedle Street, E.C.2.

Companies' Returns

Statements of Capital

Siemens & General Electric Railway Signal Co., Ltd.—Capital, £20,000 in 10,000 "A" ordinary and 10,000 "B" ordinary shares of £1. Return dated June 28th. 3,500 "A" and 3,500 "B" shares taken up. £7,000 paid. Mortgages and charges nil.

Dubilier Condenser Co. (1925), Ltd.—Capital, £500,000 in 500,000 10 per cent. non cumulative preference shares of 10s. and 5,000,000 ordinary shares of 1s. Return dated July 14th. 200,000 preference and 1,539,375 ordinary shares taken up. £176,968 15s. paid. Mortgages and charges nil.

Greenwood & Batley, Ltd.—Capital, £600,000 in 140,000 7 per cent. cumulative preference, 354,585 ordinary and 105,415 unclassified shares, all of £1. Return dated July 14th. 110,660 preference and 354,585 ordinary shares taken up. Paid up; £448,788 (£1 on 96,000 preference and 342,195 ordinary shares, 6s. on 14,660 preference and 10s. on 12,390 ordinary shares). Mortgages and charges: £100,000.

Vactite Wire Company (1919), Ltd.—Capital, £25,000 in £1 shares. Return dated March 9th. 15,000 shares taken up. £3 paid. £14.997 considered as paid. Mortgages and charges: £1,000.

Mortgages and Charges

Rainsford & Lynes, Ltd.—Satisfaction in full on or before June 21st. 1913, of trust deed dated September 29th, 1896, securing £2,000 debentures, and registered January 28th, 1904, and debentures for £2,000 and mortgage for £500, all dated September 18th, 1896, included in statement filed pursuant to Section 12, 1937, Act. (Notice filed September 15th, 1939.)

Radio Teleception, Ltd.—Two debentures, charged on the company's property, present and future, including uncalled capital, both dated September 14th, 1939, to secure £50, respectively. Holders: (a) Wm. Lloyd-Taylor, 43, Sherwood Road, Hendon, and (b) Mrs. Erna L. Smith, 39, Sherwood Road, Hendon.

Southern Ignition Co., Ltd.—Particulars filed of debentures not exceeding £500, authorised September 9th, 1939, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £500.

Company Liquidations

Traffics Radio Syndicate, Ltd.—Meetings, October 26th, at Merthyr House, James Street, Cardiff, to receive an account of the progress of the liquidation by the liquidator, Mr. J. Pearson-Griffiths.

Excelsior Electric Cleaner Co., Ltd.—Meeting, October 23rd, at 52, Queen Victoria Street, London, E.C.4, to receive an account of the winding-up by the liquidator, Mr. A. G. T. Oakley.

Receivers Appointed and Released

H.L.T. Electric, Ltd.—(a) Lionel Saunderson, of 18, Marlpit Lane, Coulsdon, Surrey, ceased to act as receiver and manager on September 11th, 1939. (b) Bernard Collett, of 14, Richmond Gardens, W.12, was appointed receiver and manager on above date, under powers contained in charge dated January 30th, 1939.

Bankruptcy Proceedings

D. F. Wilkinson, "Greenore," 62, Marston Gardens, Luton, Beds, lately carrying on business at 238, Stockingstone Road, Luton, and formerly 25, John Street, Luton, electrical engineer.—At the public examination held recently at the Court House, Luton, it was stated that there were gross liabilities of £2,949, of which £1,708 was expected to rank for dividend, with net assets of £97, leaving a deficiency of £1,702. The failure was mainly attributed to heavy trade losses, particularly in connection with wireless sets. The examniation was adjourned for closing.

S. Watson and **E. Guest,** trading in co-partnership as the Bodmin Motor and Electrical Co., Park Garage, Bodmin, Cornwall. (Separate application of Sydney Watson.)—This debtor applied for his discharge recently at the Town Hall, Truro, when it was reported that the receiving order was made in May, 1931. The assets of the joint estate had realised £1,194, and a dividend of 5s. 3d. in the £ had been paid on proofs for £2,457. The discharge was granted, subject to three months' suspension.

C. E. Ross and **T. E. Perks,** electrical engineers, 106, Piccadilly, London, W. Separate application for discharge to be heard on October 17th at Bankruptcy Buildings, Carey Street, W.C.2.

R. S. Wright, wireless dealer, 33, Broomfield Road, Coventry.—Application for discharge to be heard on October 10th at the County Hall, Coventry.

W. G. Harden and **C. H. Chinery,** electrical and mechanical engineers, lately trading as Harden & Chinery, 7, Barnsbury Street, Islington, London.—Last day for receiving proofs for dividend, October 10th. Trustee, Mr. H. H. Gaine, Bankruptcy Buildings, Carey Street, W.C.2, Official Receiver.

H. M. Brown, electrical engineer, 97, St. Helens Street, Ipswich.—First and final dividend of 6s. 6¼d. in the £, payable October 5th at 17, Museum Street, Ipswich.

V. W. Henry, radio and electrical engineer, Acle, Norfolk.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released September 13th.

A. T. Burden ("Meth-Lac" Works), electrical engineer, Upper Devizes Road, Salisbury.—Trustee, Mr. H. T. Jones, 12, Rolleston Street, Salisbury, Official Receiver, released September 14th.

F. W. Scott, radio and electrical dealer, 106, Leeds Road, Ontwood, near Wakefield.—Last day for receiving proofs for dividend October 4th. Trustee, Mr. B. S. Briggs, 13, Burton Street, Wakefield, Official Receiver.

H. V. Sore, electrical engineer, Electra House, Sun Street, Hitchin.—First and final dividend of 2s. 7½d. in the £, payable at 6, The Parade, Northampton.

Reports and Dividends

The Lancashire Dynamo & Crypto, Ltd., has announced an interim dividend of 5 per cent., less tax (against 7½ per cent.). The directors state that this dividend is declared in accordance with the policy laid down at the last annual meeting of paying a regular dividend of 15 per cent. per annum and augmenting this, if the results justify it, by the payment of a further bonus at the end of the year. The total distribution for 1938 was 25 per cent.

The W. R. Sykes Interlocking Signal Co. reports a profit for the year to April 30th, after providing for depreciation, taxation and all charges, of £7,304, as compared with £4,400 in the preceding year. General reserve receives £3,000, and special reserve £2,500. A dividend is paid on the cumulative "A" preference shares of 7s. each for the two years from November 1st, 1934, to October 31st, 1936, at 6 per cent. per annum, less tax, and £5,093 is carried forward (against £4,547 brought in).

Stewarts & Lloyds, Ltd.—An extraordinary general meeting and meetings of the various classes of stockholders were held on September 21st in Glasgow at which resolutions were adopted increasing the capital of the company with a view to the acquisition of the issued share capital of the Stanton Ironworks Co., Ltd., and authorising the directors to carry out the terms of the agreement. Mr. A. C. MacDiarmid (chairman), who presided, said that holders of over 90 per cent. of the ordinary stock and of over 90 per cent. of the preference stock of the Stanton Co. had ratified the agreement and accepted their offer.

Stothert & Pitt, Ltd., report a net profit for the year to June 30th of £115,070, as compared with £66,230 for 1937-38. Reserve receives £60,500 (against £30,000), and it is proposed to pay an ordinary dividend of 10 per cent. (same), and a cash bonus of 5 per cent. (against 2½ per cent.), for the year.

Thos. W. Ward, Ltd., report a profit for the year to June 30th of £196,542, a decrease of £48,553 as compared with the preceding year, after charging reserve for taxation. Depreciation requires £45,576, leaving a net profit, with balance brought in, of £150,576 (against £188,494). It is proposed to pay a final ordinary dividend of 7 per cent., making 10 per cent. for the year, to place £15,000 to reserve, and £2,000 to employees' fund. The balance carried forward is increased by £6,886 to £105,939. The final dividend for 1937-38 was 6¼ per cent., making 10 per cent. for the year, plus a diamond jubilee bonus of 2½ per cent.

The Madras Electric Tramways (1904), Ltd., is postponing consideration of an interim dividend on the 6 per cent. preference shares until the full results are available, owing to the direct tram route between the north and south having to be closed for repairs.

(Continued on next page.)

STOCKS AND SHARES

TUESDAY EVENING.

THE business days preceding the introduction of the Supplementary Budget found Stock Exchange business at a low ebb. Some House firms managed to do a fair number of bargains in the industrial markets, but it is very certain that the majority of brokers and jobbers barely made enough profit to pay for their modest lunches. Investment and speculation were in a state of suspense, waiting upon Sir John Simon's speech on the Wednesday in this week. Nervousness still characterises the market for home electricity supply shares. No change has yet been made in the minimum prices fixed early this month for gilt-edged securities. British Aluminium, Callender's, Lancashire United Transport and Midland Electric Power companies are amongst those which have declared the same interim dividends as those of a year ago.

Minimum Prices

Bank Rate remains at 4 per cent. The yield on War Loan, at the fixed minimum price of 88½, is also about 4 per cent. The contention that this state of affairs is illogical is increasingly expressed. Either one or the other, it is held, should be reduced. Last week there was some expectation of a reduction in Bank Rate. When this failed to materialise, the possibility of a drop in the minimum prices for gilt-edged stocks was canvassed. But quotations remain at the minima fixed before the rise in Bank Rate. These prices seem to have an almost total lack of appeal to new buyers, who can leave their money temporarily on deposit at a fair rate of interest without fear of depreciation. The consequence is a continuance of the frozen state of the gilt-edged market, and of the virtual impossibility of selling Trustee securities. Necessitous sellers are thus diverted to other markets, some of which have considerable scars to show for taking over the burden from a protected gilt-edged market.

Electricity Supply

After the first recoil from the shock of war, prices in the market for electricity supply shares have become steadier, although in a few instances quotations have this week been marked lower. The black-out is an obvious cause of the present sombre aspect of this market; the proposed restriction of domestic consumption of current has provided another stick with which to chastise this section. These more obvious factors tend to obscure the prospect of greatly increased demand for industrial power and lighting; and it is supposed that at least part of any rise in costs of production can be passed on to the consumer. Remembering also the financial resources possessed by most of the big undertakings, the holder of Home electricity supply shares is not likely to allow his equanimity to be seriously disturbed by the fall in prices.

Question of Locality

In the adjustment of prices for electricity supply shares, geographical considerations seem to have had a measure of influence. Thus, generally speaking, the shares of the big London companies are quoted to yield appreciably more than those of provincial and north-country undertakings. This table illustrates the point:—

	Price	Yield £ s. d.
County of London	28/3	7 8 8
Metropolitan	35/–	6 17 2
Northmet Power	32/–	6 5 0
South London	23/9	5 18 0
Lancs Light & Power	27/6	5 9 0
Midland Counties	32/–	5 0 0
North Eastern Elec.	24/–	5 16 8
Scottish Power	28/9	5 11 4
Yorkshire Elec.	28/9	5 11 4
Bournemouth & Poole	58/9	5 2 0
West Gloucester	16/3	3 1 6

Judging from prices, holding companies' shares are also rated rather lower than those of the provincial supply companies. For neither Edmundsons, at 20s., British Power & Light at 23s., nor Electric Finance and Securities, at 40s., yield less than 6 per cent. on the last-paid dividends.

Electrical Equipment Companies

When people again have more time and need to consider new investment, they may well be tempted by the returns available from first-class British ordinary shares. This should, of course, apply particularly in the case of the industries—not necessarily of the full-blooded armament type—which have vital parts to play in the defence and armament schemes. Electrical equipment companies are a case in point. Many of them are no strangers to work for the armed forces. And the full weight of their manufacturing capacitities can be swung into the national armament effort with small delay or disturbance.

Balance-sheets of the leading companies show a standard of financial, as well as technical, equipment which shareholders must find very reassuring in these times. Financial prudence has generally left a comfortable margin between the amounts earned for dividend and those distributed to shareholders. This week's further falls in Associated Electrical and English Electric shares add point to the suggestion that they are worth the investor's scrutiny.

Present Yields

From the point of view of industry, the political shocks of 1938 were not conducive to the making of exceptional profits. So that, in considering the present yields on industrial shares, last year's dividends may not prove a very misleading basis, although the cautious will allow a fair margin for contingencies. A month or two ago investment was satisfied with a return of around 5 per cent. on front rank industrial shares, among which General Electrics and Associated Electrical might be taken to represent the electrical equipment market. Shares in the latter company now stand at about 31s. 3d., to yield nearer 6½ per cent., while General Electrics, which admittedly suffered heavily from the mere fact of being marketable, yield over 6 per cent. at 65s. Johnson and Phillips, at 36s. 3d., return nearly 7 per cent. Siemens, at 20s., and Electric Constructions, at 35s., pay 7½ per cent. and 7¾ per cent. respectively. There are returns of between 8¾ and 10 per cent. on Crabtrees, Walsall Conduits and Allen Wests. Perhaps this week's Budget will call for a widespread readjustment of ideas as to what dividends can be expected over the next few years and what is a proper yield to look for now. In the meantime, there is much to be said for the contention that these returns probably discount the future to a great extent.

Incomes and Savings

Stress is being laid on the importance of supporting a reasonable standard of prosperity throughout the country. Taxation and borrowing have to provide colossal sums for the successful prosecution of the war. Neither can provide the necessary amount of money without adequate incomes and savings at the source. This truism is being hammered in by people concerned to see the difficulty of carrying on business as usual in these early stages of the changeover to full wartime organisation. Later on, employment will doubtless rise again, and many private and company incomes will reach or maintain reasonable standards. Control of profits and the hand of the tax-collector will certainly keep any net increases within strict limits. Nevertheless, there will be savings over, and these will seek investment. Government defence loans will have the first call in that respect. After that, industrial ordinary shares may be found to have a decided appeal, if prices remain at levels which offer such attractive prospective yields as they do now.

Lancashire Dynamo Dividend

The interim dividend declaration by Lancashire Dynamo and Crypto recalls the statement of policy made by the chairman in March. In recent years, a sequence of good results has been reflected in successive increases in the dividends paid. In effect, the distribution was raised by stages from 1¼ per cent. for 1931 to 25 per cent. for 1938. A policy of greater stability was explained at the last annual meeting as being in the best interests of the company. A figure of 15 per cent. was taken as the level at which to stabilise dividends, the intention being to add cash bonuses when justified by the outlook and profits. By a coincidence, both the policy and the rate of dividend accord with those lately decided on by Crompton Parkinson. The 5 per cent. payment just declared compared with last year's interim dividend of 7½ per cent. With the shares at 58s. 9d., the yield of a "standard" 15 per cent. payment would be £5 2s. per cent. At the 25 per cent. dividend last paid, the return comes to 8½ per cent.

Financial Section (*Concluded from previous page*)

Reports and Dividends—contd.

The British Aluminium Co., Ltd., is maintaining its interim dividend at 4 per cent.

Murex, Ltd., is paying a final ordinary dividend of 10 per cent., plus a cash bonus of 2½ per cent., making a total distribution for the year of 20 per cent., less tax. Similar payments were made in respect of the previous year.

The Montreal Light, Heat & Power Consolidated has announced a dividend of 37 cents for the quarter ending September 30th (same).

Cable and Wireless (Holding), Ltd., announces a dividend on the preference stock of 2¾ per cent., less tax, for the half-year ended June 30th.

Cable and Wireless, Ltd., has declared an interim dividend at the rate of 1½ per cent. less tax, in respect of the year ending December 31st. This distribution is at the same rate as the interim payment made last year.

Hopkinsons, Ltd., have declared an interim dividend of 5 per cent. (against 2½ per cent.).

Altrincham Electric Supply, Ltd., has announced interim dividends of 10 per cent., less tax, on the ordinary shares and 18 44/57ths per cent. on the deferred shares (same).

Callender's Cable & Construction Co., Ltd., has declared an interim dividend of 5 per cent. (same).

Venner Time Switches, Ltd., has decided to defer consideration of an ordinary dividend until the results of the year's trading are ascertained. An interim dividend of 5 per cent. was paid a year ago.

The Midland Electric Corporation for Power Distribution is maintaining its interim dividend at 3 per cent., less tax.

The Watford Electric & Manufacturing Co., Ltd., is maintaining its interim dividend of 5 per cent.

The Lancashire United Transport & Power Co., Ltd., is paying an interim dividend of 4 per cent. (unchanged).

Marconi's Wireless Telegraph Co., Ltd., is again paying interim dividends of 3½ per cent. on the ordinary shares and 3½ per cent. on the 7 per cent. participating preference shares.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1939 Highest	1939 Lowest	Dividend Previous	Dividend Last	Price Sept. 26	Rise or Fall	Yield £ s. d. p.c.
Home Electricity Companies							
Bournemouth and Poole	68/3	58/6	15	15	58/9	—	5 2 0
British Power and Light	30/9	23/–	7	7	23/–	—	6 1 9
City of London	33/9	25/6	7½	7½	25/6	–1/–	6 0 0
Clyde Valley	37/9	27/6	8	8	27/6	—	5 16 5
County of London	46/9	28/–	10½	10½	28/3	–⅛	7 8 8
Edmundson's:							
7% Pref.	31/6	27/6	7	7	28/6	—	4 18 3
Ord.	27/9	19/–	9	6	19/–	–1/–	6 6 4
Elec. Dis. Yorkshire	41/6	33/9	9	9	33/9	—	5 6 8
Elec. Fin. and Securities	47/9	40/–	12½	12½	40/–	—	6 5 0
Elec. Supply Corporation	51/9	41/–	12	12	41/3	—	5 16 0
Isle of Thanet	20/–	15/–	4	4	15/–	—	5 6 8
Lancs Light and Power	34/6	27/6	7½	7½	27/6	—	5 9 0
Llanelly Elec.	22/6	18/–	5½	5½	18/–	—	6 2 3
Lond. Assoc. Electric	30/–	19/–	7	7	19/6	–6d.	7 3 7
London Electric	34/3	27/6	7	7	27/9	–⅛	5 1 10
London Power Deb. Red.	106½	98	5	5	98½	—	5 1 6
Metropolitan	51/–	35/–	12	12	35/–	–2/–	6 17 2
Midland Counties	38/9	32/–	8	8	32/–	—	5 0 0
Mid. Elec. Power	41/9	35/–	8	9	35/–	–1/–	5 2 10
Newcastle Elec.	28/9	26/–	7	7	26/3	—	5 6 8
North Eastern Electric:							
Ordinary	32/3	24/–	7	7	24/–	–6d.	5 16 8
7% Pref.	32/6	28/–	7	7	28/–	—	5 0 0
Northampton	48/–	41/–	10	10	41/3	—	4 17 0
Notting Hill 6% Pref. (£10)	12½	11½	6	6	11½	—	5 4 4
Northmet Power:							
Ordinary	46/6	32/–	10	10	32/–	—	6 5 0
6% Pref.	29/–	23/6	6	6	23/9	—	5 1 1
Richmond Elec.	29/–	23/6	7	7	23/9	—	5 18 0
Scottish Power	38/9	28/6	8	8	28/9	—	5 11 4
Southern Areas	22/9	18/–	5	5	18/–	—	5 11 3
South London	30/9	23/9	7	7	23/9	—	5 18 0
West Devon	23/3	18/9	5	5	18/9	–⅛	5 6 8
West Glos.	21/3	16/3	2	2½	16/3	—	3 1 6
Yorkshire Elec.	38/6	28/9	8	8	28/9	–⅛	5 11 4
Overseas Electricity Companies							
Atlas Elec.	4/3	1/6	Nil	Nil	1/6	—	—
Calcutta Elec.	39/–	25/–	10*	10*	25/–	—	—
Cawnpore Elec.	34/6	28/3	10	10	28/3	—	—
East African Power	26/3	20/–	7	7	20/–	–1/–	7 0 0
Jerusalem Elec.	24/6	21/–	7	7	21/–	—	6 13 4
Kalgoorlie (10/–)	10/6	9/6	7½	7	10/–	—	7 0 0
Madras	31/–	21/3	8*	8*	21/3	—	—
Montreal Power	35½	30	1½	1½	31	–2½	—
Palestine Elec. "A"	29/6	20/–	7½*	5*	20/–	—	5 0 0
Perak Hydro-electric	18/9	13/6	7	6	16/3	—	7 7 8
Shawinigan Power	23½	20	85cts.	83cts.	22	—	—
Tokyo Elec. 6%	61	37	6	6	39½	—	15 4 0
Victoria Falls Power	73/9	60/–	12½	15	61/3	–⅛	4 18 0
Whitehall Investments Pref.	19/6	12/6	7½	7½	12/6	–½	12 0 0
Public Boards							
Central Electricity:							
1950–70	112	103	5	5	103	—	4 17 1
1955–75	115½	104½	5	5	104½	–2½	4 15 8
1951–73	106½	101	4½	4½	101	—	4 9 0
1963–93	95½	84	3½	3½	84	—	4 3 4
London Elec. Trans. Gtd.	88½	83	2½	2½	83	—	2 19 6
London & Home Counties							
1955–75	107½	105	4½	4½	105½	—	4 5 6
Lond. Passenger Transport:							
A	114½	103	4½	4½	103	—	4 7 5
B	117½	102	5	5	102	—	4 18 0
C	83½	64½	4½	4	65	—	6 3 1
West Midland Joint Elec., 1948–68	112½	104½	5	5	104½	–2½	4 15 8
Telegraph and Telephone							
American Tel. & Tel.	198	159	9	9	195	—	4 12 4
Anglo-Am. Tel.:							
Pref.	101½	89½	6	6	91½	—	6 11 9
Def.	23⅜	19	1½	1½	21	—	7 2 10
Anglo-Portuguese	24/–	17/6	8	8	17/6	–½	9 2 10
Cable & Wireless:							
5½% Pref.	95½	75	4½	5½	80½	—	6 16 8
Ord.	55	34	4	4	45½	—	8 16 0
Income	100	90	—	—	90	–1½	4 9 0
Canadian Marconi $1	5/6	3/9	—	Nil	5/6	—	—
Globe Tel. & Tel.:							
Ord.	31/3	23/6	7½*	7½*	27/6	—	5 9 1
Pref.	26/9	23/3	6	6	23/9	—	5 1 1
Great Northern Tel. (£10)	38	27½	20	20	28	—	7 7 10
Inter. Tel. & Tel.	10½	5½	Nil	Nil	6	—	—
Marconi-Marine	30/–	23/–	7½	10	25/–	–⅛	8 0 0
Oriental Telephone Ord.	2½	46/3	12*	12*	2 7/16	—	4 16 0
Radio Corpn.	8⅞	5⅜	8	6	7½	+	—
Telephone Props.	14/–	12/9	5	6	13/9	—	8 14 6
Telephone Rentals (5/–)	10/–	7/3	10	10	7/3	–3d.	6 18 0
Western Union	29½	19½	2⅜	—	40	+10½	—
Traction and Transport							
Anglo-Arg. Trams:							
First Pref. (£5)	7/6	3/6	Nil	Nil	3/9	—	—
4% Inc.	16	7	Nil	Nil	7½	—	—
British Electric Traction:							
Def. Ord.	1025	540	5	5	550	—	—
Pref. Ord.	164	140	8	8	140	–5	5 14 3
Bristol Trams	52/6	37/3	8	10	37/6	—	5 6 8
Brazil Traction	13	7⅞	$1	50c.	8	—	—
Calcutta Trams	25/6	20/9	8	8	20/9	–1/3	7 14 3
Cape Elec. Trams	18/–	16/9	5	6	17/–	—	7 1 2
Lancs Transport	37/9	30	10	10	30/–	—	6 13 4
Mexican Light:							
1st Bonds	25	20	5	5	20	—	—
Rio 5% Bonds	81	47	5	5	65	—	7 9 3
Southern Rly:							
5% Prefd.	75½	48	5	5	52	+3	9 12 4
5% Pref.	99½	79	5	5	80	—	6 5 0
T. Tilling	2½	33/9	10	10	33/9	—	5 18 6
Tilling & B.A.	54/6	47/6	10	9*	47/6	—	3 15 6
West Riding	37/9	31/3	10	10	30/–	–2/–	—
Equipment and Manufacturing							
Aron Electricity Ord.	32/3	28/9	15	15	30/–	—	10 0 0
Assoc. Elec.:							
Ord.	45/3	31/3	10	10	31/3	–2/9	6 8 0
Pref.	36/6	31/3	8	8	31/3	–⅛	5 2 5
Automatic Telephone & El.	47/6	39/3	10	12½	40/–	–½	6 5 0
Babcock & Wilcox	48/–	37/–	10	12½	42/6	+⅛	5 17 8
British Aluminium Ord.	58/9	48/9	12½	12½	55/–	–⅛	4 11 0
British Insulated Ord.	88/–	77/–	20	20	77/6	–⅛	5 3 3
British Thermostat (5/–)	16/–	12/–	18½	18½	13/9	—	6 14 7
British Vacuum Cleaner (5/–)	22/6	14/–	40	40	15/–	—	—
Brush Ord.	5/9	4/6	Nil	Nil	4/9	—	—
Callender's	92/–	60/–	20	15	60/–	–½	5 0 0
Chloride Elec. Storage	82/3	62/6	20	15	3½	+⅛	4 12 4
Consolidated Signal	96/–	75/–	36½	36½	75/–	—	9 14 8
Crabtree (10/–)	25/6	17/6	17½	17½	17/6	–⅛	10 0 0
Crompton Parkinson:							
Ord. (5/–)	21/–	12/6	12½	15	13/9	+⅛	—
E. K. Cole (5/–)	9/–	3/6	10	Nil	3/6	–3d.	—
Elec. & Musical Industries (10/–)	14/9	7/6	10	5	7/6	—	6 18 0
Electric Construction	38/6	30/6	12½	13½	35/–	—	7 14 3
Enfield Cable Ord.	58/6	47/6	25	16½	47/6	—	6 16 6
Electrical Switchgear (10/–)	27/–	23/9	16	16	23/9	—	6 14 9
English Electric	36/6	25/–	10	10	25/–	–3/9	8 0 0
Ensign Lamps (5/–)	16/9	13/9	—	25	15/9	—	7 18 3
Ericsson Tel. (5/–)	43/–	35/–	25*	25*	37/6	–⅛	3 6 5
Ever Ready (5/–)	24/–	18/–	35	30	22/–	–6d.	6 16 4
Falk Stadelmann	27/–	18/9	10	6	18/9	—	6 8 0
Ferranti Pref.	25/6	22/6	7	7	23/–	—	6 1 9
G.E.C.:							
Pref.	31/9	26/3	6½	6½	26/3	—	4 19 2
Ord.	82/–	63/–	17½	20	63/9	—	6 5 9
Greenwood & Batley	27/6	22/6	7	15	22/6	—	13 6 8
Hall Telephone (10/–)	22/3	19/3	15	15	20/–	—	7 10 0
Henley's (5/–)	21/–	16/3	20	20	16/3	—	6 3 1
4½% Pref.	23/–	21/–	4½	4½	21/3	—	4 4 8
Hopkinsons	46/3	37/3	12½	15	38/9	–⅛	7 15 0
India-Rubber Pref.	21/3	18/9	5½	5½	18/9	—	5 17 4
Intl. Combustion	120/–	97/–	32½	32½	5½	–½	5 18 9
J. Lucas	60/–	51/–	15	15	51/3	–⅛	5 17 0
Johnson & Phillips	41/3	32/–	12½	12½	36/3	—	6 17 10
Lancashire Dynamo	68/–	57/6	25	25	58/9	–⅛	8 10 0
Laurence Scott (5/–)	12/–	9/6	15	15	9/6	—	7 18 4
London Elec. Wire	31/6	28/6	12	7½	28/9	—	5 4 4
Mather & Platt	50/–	41/3	13½	13½	41/3	—	6 11 3
Metropolitan Elec. Cable Pf.	21/3	21/–	5½	5½	21/3	—	5 3 6
Murex	85/9	63/9	20	20	75/6	–½	5 6 8
Pye Deferred (5/–)	13/9	7/6	25	25	8/–	—	15 12 6
Revo (10/–)	35/6	25/–	17½	17½	25/–	–⅛	7 0 0
Reyrolle	61/–	52/6	12½	12½	55/–	–⅛	4 11 0
Siemens Ord.	26/9	20/–	7½	7½	20/–	—	7 10 0
Strand Elec. (5/–)	5/6	3/9	5	10	3/9	—	3 6 8
S. Smith (1/–)	9/–	6/–	37½	50	6/3	—	8 0 0
Switchgear & Cowans (5/–)	15/–	10/–	20	20	10/–	—	10 0 0
Telegraph Condenser (10/–)	7/6	5/–	5	—	7/3	–3d.	—
Telegraph Construction	2½	37/3	10	10	38/9	—	5 3 1
Telephone Mfg. (5/–)	10/–	8/–	9	9	8/–	—	5 12 6
Tube Investments	91/–	72/6	23½	23½	72/6	–½	6 10 9
Vactric (5/–)	4/3	2/3	10	4	2/3	—	8 18 0
Vickers (10/–)	24/6	14/6	10	10	14/9	–1/–	6 15 7
Ward & Goldstone (5/–)	22/6	19/6	20	20	19/9	—	5 1 3
Westinghouse Brake	54/9	42/6	17½	17½	42/6	—	8 4 9
Walsall Conduits (4/–)	31/9	22/6	55	55	22/6	—	9 9 2
West, Allen (5/–)	7/6	5/9	7½	10	5/9	—	8 14 0

* Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Australia.—BRISBANE. — October 11th. Electrically driven pumping unit comprising pump, motor, discharge column in well, shafting and control gear, &c. Department of Irrigation, Water Supply and Sewerage, Executive Buildings, George Street, Brisbane. (T. 26172/39.)*

City Council. October 27th. One three-phase, 17,500-kVA transformer. (T. 26873/39.)*

October 24th. City Electric Light Co., Ltd. Paper insulated, lead-covered cables. (T. 26907/39.)*

PERTH.—November 2nd. Western Australia Government Tender Board. Supply and delivery of two 500-kW mercury arc rectifiers, switchgear, feeders, control system, &c. (T. 26439/39.)*

SYDNEY.—October 17th. Posts and Telegraphs Department. Lead sheathed cable. (T. 26613/39.)*

October 24th. Lamps, lamp caps and sockets. (T. 26617/39.)*

Loading carrier coils, &c. (T.26806/39.)*

Brighton.—Corporation. October 16th. Civil engineering works in connection with the augmentation of the circulating water system at Southwick power station. Specifications from Mr. W. N. C. Clinch, engineer and manager. Tenders to Town Clerk.

Dewsbury.—October 12th. Electricity Department. 11,000 V. metalclad switchgear. (See this issue.)

Dundee.—October 11th. Electricity Department. Multi-core low-voltage paper-insulated, lead-covered and armoured cable. (September 22nd.)

Egypt.—CAIRO.—October 18th. Extension of the electrical network at Damietta. Municipalities Department. (T. 26152/39.)*

Eire.—KILKENNY.—October 7th. County Board of Health and Public Assistance. Electric cooking equipment for the County Hospital, Kilkenny. Forms from J. V. Downes, 53, Fitzwilliam Square, Dublin (deposit £3 3s.).

Hastings.—October 12th. Electricity Department. 110-V secondary battery having a capacity of 350, 450 or 500 Ah, complete with trickle charger and motor generator charging plant. (September 22nd.)

Hebden Royd.—October 3rd. U.D.C. One 300-kVA transformer and one high-voltage circuit-breaker. (September 22nd.)

London. — BATTERSEA. — October 31st. Electricity Department. One 30,000-kW turbo-alternator and ancillary plant, and two 180,000 lb. boilers and ancillary plant. (See this issue.)

India.—NEW DELHI.—October 26th. Cotton and silk covered and enamelled copper wires required for the year ending February 28th, 1941. (T. 26947/39.)*

SIMLA.—October 5th. Indian Stores Department. One 80-kW oil-driven alternator set. (T. 26837/39.)*

Manchester.—October 5th. Electricity Committee. One mercury arc rectifier equipment with an output of 30 kW continuously at 400/200-V, DC. (September 15th.)

October 19th. Electricity Committee. Supply for twelve months ending December 31st, 1940, of AC electric fan motors. (See this issue.)

New Zealand.—WELLINGTON.—November 14th. Supply of 50-kV, three-phase, outdoor switchgear and steelwork complete with insulators and accessories. (T. 26179/39.)*

November 21st. Public Works Department. Protective relays for 110-kVA transmission lines. (T. 26821/39.)*

Pembrokeshire.—September 29th. Renewal of fog-signalling machinery and installation of electrical generating plant at the South Bishop lighthouse off the Pembrokeshire coast. Secretary, Trinity House, Tower Hill, London, E.C.3.

Sheffield.—October 10th. Electricity Department. Automatic fire-fighting equipment for switch-houses at Neepsend power station. (September 22nd.)

Skipton.—October 6th. Installation of electric lighting at Bradley (near Skipton) School. H. Marsden, Acting Divisional Clerk, West Riding Education Offices.

South Africa.—JOHANNESBURG. — November 17th. City Council. 33-kV switchgear and auxiliary plant. (T. 25663/39.)*

November 20th. Railways and Harbours Administration. Superheater elements. (T. 26975/39.)*

WINDHOEK.—October 18th. Municipality. Two AC generators. (T. 26700/39.)*

Uruguay.—MONTEVIDEO.—October 11th. State Electricity Supply and Telephones' Administration. Lead-covered telephone cable. (See this issue.)

November 10th. 300,000 metres of telephone cable. (T. 26933/39.)*

Orders Placed

Belfast.—Electricity Committee. Accepted. 33-kV and 6.6-kV armour-clad switchgear and interconnecting cables.—A. Reyrolle & Co. AC motors and wiring to replace existing DC installations at consumers' premises.—Fraser and Borthwick; Crompton Parkinson; Wm. Coates & Son; Metropolitan-Vickers Electrical Co.

Brighton. — Corporation. Accepted. Fan motors for boilers.—Allen West & Co. Steam and feed piping.—Stewarts & Lloyds, Ltd. Boiler control panels.—Bailey Meters & Controls, Ltd. Steam and feed valves.—Dewrance & Co., Ltd.

X-ray equipment at Municipal Hospital.—Newton & Wright. Transformer unit, &c., for X-ray apparatus.—Watson & Sons (Electro-Medical), Ltd.

Public Assistance Committee. Recommended. Rewiring the electrical installation at Elm Grove Home.—H. J. Galliers, block "J" (£278), and Marchant & Martin, block "L" (£196).

Consett.—U.D.C. Accepted. Electrical installations in 246 houses.—Highbury Engineering Co.

Ilford.—Electricity Committee. Accepted. Steel kiosks in Woodford Avenue (£540).—Crompton Parkinson, Ltd.

Ipswich. — Electricity Committee. Accepted. Coal handling plant (£194).—Mayor & Coulson, Ltd.

Mansfield.—Health Committee. Accepted. Electric vehicle (£638).—Electricars, Ltd.

Newcastle-on-Tyne.—City Council. Accepted. Electrical fittings for the relighting of the High Level and Redheugh Bridges (£806).—General Electric Co., Ltd.

Shipley.—Electricity Committee. Accepted. Cables (£8,208).—Hackbridge Cable Co.

Stoke-on-Trent. — General Purposes Committee. Accepted. Seven electric warning sirens.—Gent & Co., Ltd.

Warrington.—Electricity Committee. Accepted. Cables.—B.I. Cables. Earthenware conduits.—Albion Clay Co. Cable protector slabs, tiles and covers.—H. J. Baldwin & Co.

NEW PATENTS

Owing to the adjustments in procedure necessitated by the new Patents, Designs, Copyright and Trade Marks (Emergency) Act, there has been a slight delay in the issue of the *Patent Office Journal*. This accounts for the absence of our usual list of new electrical patents, but we hope to resume its publication next week.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Cinema, Great Northern Road, for Aberdeen Picture Palaces. Cinema, Shiprow, for Associated British Cinemas, Ltd.

Addington.—Houses (30), Rochford Green; First National Housing Trust, Ltd., Lodge Lane, Addington.

Amesbury. — Senior C.E. school; Bothams & Brown, architects, Chipper Lane, Salisbury.

Ayr.—School, Troon, for C.C.; J. R. Lockie, county clerk, County Buildings, Ayr.

Bakewell.—Houses (15), Tideswell, for the R.D.C.; J. Turner, contractor, King Street, Bakewell. Extensions, Haddon Joint Hospital; A. Eaton & Son, architects, 6, The Strand, Derby.

Bangor.—Hall, for University College of North Wales; W. Moss & Sons, Ltd., contractors, Roscoe Street, Liverpool.

Barking.—Town hall and municipal buildings (£142,753), for T.C.; T. Bates & Son, Ltd., contractors, River Road, Barking.

Barnstaple.—Girls' school, for E.C.; borough surveyor.

Baschurch (SALOP).—Senior school, for Rev. E. Druce; Wood and Goldstraw, architects, Victoria Chambers, Station Road, Tunstall, Staffs.

Beckenham.—School, Eden Park, for E.C.; borough surveyor.

Birmingham.—Works and offices, for D. Taylor & Co., Ltd.; E. Elvins & Son, Ltd., contractors, Naden Street, Soho Hill, Birmingham. Shops and flats, corner of Rea Street and Digbeth, for T.C.; Herbert J. Manzoni, city engineer, Council House, Birmingham, 1. Large confectionery and bakery department, Holt Street, Aston, for Birmingham Co-operative Society, Ltd., High Street.

Bournemouth. — Flats, Wharncliffe Road; R. A. Phillips. Isolation hospital, Ringwood Road; borough engineer. Flats, shops and workshops, St. Peter's Road; Meyrick Estate trustees.

Brighton.—Flats, Warwick Street; D. A. Hopper, architect. Cinema, flats and shops, West Street and King's Road; H. E. King. Bungalows, Larkfield Way, Patcham; Walter E. Cox.

Bristol.—Cinema, Bedminster, for Union Cinemas, Ltd.; Marfix Co., Ltd., contractors, 102, Albany Street, London, N.W.1.

Bursiem.—Alterations and additions to Leopard Hotel and White Hart Inn; Ind, Coope & Allsopp, Ltd.

Bury.—Elementary school, Chamber Hall; borough surveyor.

Cannock.—Clinic, library and fire depot, Hednesford; U.D.C. surveyor.

Carmountside (STAFFS).—Houses, Leek Road; P. H. Bott.

Carnforth.—Houses (44); H. L. Moody.

Croydon.—Motor factory, Purley Way; E. W. Puckert, Ltd., Barnacle Works, Bensham Lane, West Croydon. Alterations and additions, Croydon High School, Wellesley Road; Girls' Public Day School Trust, Ltd., Broadway Court, London, S.W.1.

Cuckfield.—Senior school, London Road, for C. of E. Authorities; H. W. Smith, architect, 29, George Street, Oxford.

Dartford.—Garage, L.P.T.B.; S. A. Heaps, architect, 55, Broadway, London, S.W.1.

Dudley.—Houses (46), Regent Lane, Tividale; A. & J. Mucklow. Remodel-

ling Northfield Road school; Education Committee. Development, Sledmore Farm estate; F. H. Roberts. Houses (12), Buffery estate; Timmins & Davies. Houses (49), Kingswinford Road; Lloyd Bros. Additions to factory, Ivanhoe Street; Willmott Trucks & Products, Ltd. Works extensions, Pear Tree Lane; M. & W. Grazebrook. Works extensions, Marriott Road; Walker Bros.

Durham.—School; county architect.

East Ham.—Houses (35), Langdon Crescent area; borough engineer.

Edinburgh.—Offices, Leith; L.M.S. Railway Co.

Epping.—Housing scheme, Loughton Lane, Theydon Bois; R.D.C. surveyor.

Felling-on-Tyne.—School for Felling U.D.C.; H. Fawcett, Council Offices, Felling-on-Tyne.

Fifeshire.—Baths, Comrie; secretary, Miners' Welfare Fund, Dunfermline.

Fleet.—Block of shops, Norway Lodge, Fleet Road; A. G. Moulton.

Flintshire.—Central school, Holywell, for C.C.; R. G. Whitley, county architect, County Buildings, Mold.

Golders Green.—Rebuilding of Ionic Cinema, 612, Finchley Road, for Ionic Theatres, Ltd.; W. J. King, architect, 16, Jermyn Street, London, S.W.1.

Greenford.—Shops, flats and garages, Western Avenue, for J. B. Leaver; B. Smith & Son (Builders), Ltd., Greystoke Park, Ealing.

Guildford.—Shops and flats, Worpleston Road; W. Pleece & Son, Ltd.

Hampshire.—School, Fareham Park, for E.C.; A. L. Roberts, county architect, The Castle, Winchester.

Hanford (STAFFS).—Licensed premises, Wilson Road; Worthington & Co., Ltd.

Hanley.—Houses, off Milton Road; Broadbridge, Ltd. Alterations and additions, Sneyd Arms and Mostyn Arms; Parkers (Burslem) Brewery, Ltd.

Hawarden.—Conversion of "Springfield" into hospital, for Cottage Hospital Committee; secretary.

Hebden Royd.—Public baths (£14,625); U.D.C. surveyor.

Hitchin.—Council offices; U.D.C. surveyor.

Ilford.—Infants school, Barkingside; Barvis Partners, Ltd., builders, 14, Albert Road, Romford.

Ipswich.—Business premises, Queen Street; W. A. Pratt.

Jarrow-on-Tyne.—Extensions to the Robin Hood Hotel, Primrose; T. H. Murray, architect, Station Road, Consett.

Kingston-on-Thames.—Block of shops and flats, Eden Street; A. R. Kearney, architect, 25, Victoria Street, London, S.W.1.

Lancashire.—Senior school, Denton; county architect, Preston.

Leamington Spa.—Cinema and theatre, Warwick Terrace; L. L. Dussault, architect, 33, Newhall Street, Birmingham.

Leatherhead.—Hospital, Poplar Road, for Cottage Hospital governors; E. S. Hall, architect, 54, Bedford Square, London, W.C.1.

Leigh.—Houses, Thomson Street site; borough surveyor.

Leyland.—School; R.C. trustees.

Liverpool.—School, Central Avenue, Speke; city architect. Extension to printing works, Edge Lane, Littlewood's Mail Order Stores, Ltd., 100, Hall Street. Factory, Edwards Lane, for Summit Manufacturing Co. Nurses' Home, Bedford Street South; J. E. Bladon & Son, 12, Preesons Row. Houses (28), Melbreck Gardens, for Melbreck Estates, Ltd., Brooker Avenue, Garston. Flats, Lance Lane, for Glynn Trust Co., Ltd.; A. E. Shennan, architect, 17, North John Street.

London. — (ISLINGTON). — Rebuilding factory, 103-107, St. Paul's Road, for W. N. Joyce & Sons, Ltd., wallpaper merchants; H. A. Wright and S. F. Tedmarsh, architects, 35, Pentonville Road. (ST. PANCRAS).—Housing scheme, Hampshire Street and Torriano Avenue, for B.C.; A. J. Thomas, architect, 31, Sloane Street, S.W.1. (CAMBERWELL).—Florida cinema, Camberwell Road and Medlar Street, for A.B.C., Ltd.; Marfix, Ltd., 102, Albany Street, N.W.1.

Longton (STAFFS).—Reconstruction of Grafton Works; A. B. Jones & Sons. Houses (24), Chaplin Road; W. C. Beech & Co., Ltd. Houses (16), Heathcote Street; Tideswell Bros.

Lowestoft.—Fish canning factory, Hamilton Road; Lowestoft Food Products, Ltd. Bungalows, Edgerton Road; P. C. & H. W. Easey. Church, Victoria Road; Oulton Broad Congregational trustees.

Manchester. — Factory, Altrincham Road, Northen Etchells, for John Crampton & Co., Ltd., Altrincham Road, Wythenshawe; H. S. Fairhurst & Son, architects, 55, Brown Street.

Merstham.—Houses, Merstham Park estate; W. R. Davidge & Partners, architects, 5, Victoria Street, London, S.W.1.

Newcastle-on-Tyne. — Rebuilding of joinery and timber works for S. Nusenbaum and Son, City Road, Newcastle. Store and depôt for the Avon India Rubber Co.; H. Wiles, architect, 658, Durham Road, Gateshead. Houses at Benton; North Heaton Development Co., 40, Grey Street, Newcastle. Extensions, General Hospital, for the City Council; city architect. Flats, at Denton Burn; Northern Housing Development, Ltd., builders, Huddleston Road, Newcastle. Shop, Wellington Street; C. S. Errington, architect, 46, Grainger Street, Newcastle. Brickmaking machine shop for the Elswick Coal Co., Ltd., Scotswood; C. S. Errington, architect, 46, Grainger Street, Newcastle. Extensions to the tobacco factory of John Sinclair, Ltd., Bath Lane; J. Walton Taylor, architect, St. John Street, Newcastle-on-Tyne.

Newport.—Assembly hall block, Clytha Park, for T.C.; Gee, Walker & Slater, Ltd., contractors, Fitzmaurice Place, Berkeley Square, London, W.1.

Oundle & Thrapston.—Houses (30), Easton-on-the-Hill; R.D.C. surveyor.

Oxford. — Extensions to premises, Clarendon Press, Walton Street.

Portsmouth.—Houses (20), Courtmount Grove, Cosham; E. E. Wilson. Shops and flats, London Road and Amberley Road; Lillie & Co. (Portsmouth), Ltd.

Potters Bar.—Fire station, for U.D.C.; Marshall and Tweedy, architects, 96, New Cavendish Street, London, W.1.

Rochdale.—School, West Hill; borough surveyor.

Rushden.—Houses (16), Irchester Road estate, for U.D.C. Houses (14), Wymington Road; Fleet Construction Co., Ltd.

Salesbury.—Senior school; C.E. authorities.

Scarborough.—Dwellings (38), William Street, for T.C.; A. Stephenson, builder, Harrogate.

Sheffield.—Sweet factory, for W. Batty, Ltd., confectioners, Wicker Lane. Factory, Owlerton Green, for W. R. Swann & Co., Ltd., razor blade manufacturers. Extensions to factory; G. Clark (Sheffield), Ltd., Dixon Street.

Shipley.—Houses (56), Low Ash Drive; Low Ash Estate Co.

Slough.—Large skating rink, site of Oakley House, for Manor Park Construction Co., Ltd.; C. Geddes, architect, 18, Northampton Place, Swansea.

Somerset.—School. Bourneville, for C.C.; J. Dyer & Son, contractors, Locking Road, Weston-super-Mare.

Southend-on-Sea.—Rebuilding Royal Hotel, High Street, for Courage & Co., Ltd.; F. M. Kirby, staff architect.

Southgate.—Houses (22), North Circular Road; F. F. Tomlin, 195, High Road, London, N.22.

Stoke-on-Trent.—Flats, Trent Vale; city architect.

Stourport.—Houses, Walshes Farm estate, for U.D.C.; Messrs. Eadie, contractors.

Stratford.—Extensions to works, Pelly Road, for Jeyes' Sanitary Compounds, Ltd.; Grace & Farmer, architects, 3, Wardrobe Place, London, E.C.4.

Strood (KENT).—Fire stations, &c.; R.D.C. surveyor.

Sunderland.—Rebuilding of cabinet works, for Ditchburn, Ltd.; J. W. White, builder, High Barnes Works, Sunderland. School, Plains Farm estate (£89,291), for L.C.; J. W. White, contractor, Sunderland.

Surrey.—Extensions, County Hospital, Farnham, for C.C.; Saxon, Snell & Phillips, architects, Bentinck Street, Manchester Square, W.1.

Sutton-in-Ashfield. — Houses, for U.D.C.; J. Shaw & Co., builders, 18, Newdigate Street, Kimberley.

Swansea.—Alterations and additions to Volunteer Arms and Gower Inn; Truman, Hanbury, Buxton & Co., Ltd. Houses (9), off Tycoch Road; Ll. Williams. Cinema, Ravenhill Road; W. Evans.

Swinton and Pendlebury.—School, Stanwell Road, Swinton; C. Musker Bros., contractors, Bingham Street, Swinton, Manchester.

Totnes.—Extensions to warehouse, High Street, for J. Marshall (Devon), Ltd., manufacturing confectioners.

Tring.—C. of E. school; J. Honour & Son, Ltd., contractors, Akeman Street, Tring.

Tunstall.—Houses (10), Moorland View; J. Peake.

Walthamstow.—Factory, Blackhorse Lane; S. Clifford Tee and Gale, architects, Moorgate Hall, Moorgate, E.C.2.

Warlingham.—Nurses' home, Mental Hospital; Commercial Structures, Ltd., builders, Staffa Road, London, E.10.

Wellingborough.—Houses (26), off Queensway; F. Ireson and Son.

Wembley.—R.C. senior school; Nicholas & Dixon-Spain, architects, 19, Hanover Square, London, W.1.

West Riding.—Senior school, Aughton, Rotherham, for C.C.; county architect, County Hall, Wakefield.

Whitley Bay.—Houses (12), Hobart Terrace; A. G. Howe and Co., builders, St. Mary's Avenue, Whitley Bay. Houses (16), on the Fairfield Green estate; R. Ramsay, builder, Whitley Bay.

Widnes.—Houses (33), Heath Road; S. K. Royle, builder, 132, Liverpool Road.

Witney. — Houses, Carterton, for R.D.C.; Building & Public Works Construction Co., Ltd., builders, Swindon.

Wolverhampton.—Houses (14), Bakegate estate; Coslett & Highes. Extensions to New Cross Institution; borough engineer. Fire station; borough engineer. Development, Nurseries estate, Park Lane; Nicholls, Jordan & Airston. Houses, Willenhall estate; Wm. Whittingham, Ltd. Extensions, Bingley School; J. F. Hughes, Ltd.

Proposed Swansea Appointments

LAST week the Swansea City Council received the minutes of the Special Committee which has been considering a number of recommendations by the borough electrical engineer, Mr. H. E. Blackiston. The Council by a large majority accepted an amendment in favour of consideration of the minutes being deferred to the next meeting, except for two final recommendations. These were for the immediate appointment of a deputy borough electrical engineer at a salary of £900, rising by increments of £50 to £1,100, and a technical assistant (distribution) on the scale £506 to £529. Councillor W. Owen, proposing the amendment, said that the report contained so many important things that members were not yet ready to discuss it. Councillor W. T. M. Hughes thought that as the evils were known to be there the sooner they were extermined the better. That could be done only by adopting the recommendations in this "candid and brave" report.